

AD-752 050

CHEMICAL MILLING

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CHEMICAL MILLING

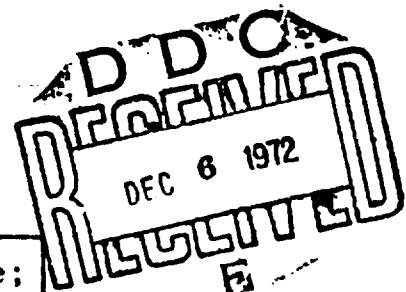
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DDC-TAS-72-60

NOVEMBER 1972

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CHEMICAL MILLING

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August 1957 - January 1972

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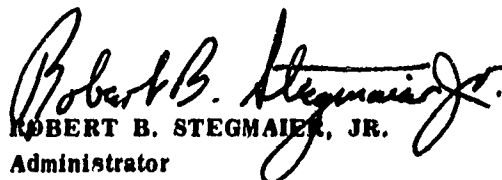
F O R E W O R D

This bibliography is a compilation of references on *Chemical Milling*. Entries were selected, using the authorized term chemical milling, from references processed into the AD data banks from January 1953 to July 1972 and supersedes AD-702 750.

Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract Number and Report Number Indexes are provided.

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ROBERT B. STEGMAIER, JR.
Administrator

Defense Documentation Center

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-252 129

WATERVLIET ARSENAL N Y

CHEMICAL MILLING

(U)

DEC 60 23P ROSE, C.H.;

REPT. NO. WVT RI-60001 IRI 60001 1

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, ALLOYS, ALUMINUM ALLOYS, CASTING, CHEMICAL REACTIONS, CORROSION, GUNS, MACHINE TOOLS, MACHINING, MAGNESIUM ALLOYS, MANUFACTURING METHODS, MECHANICAL PROPERTIES, METALS, PHYSICAL PROPERTIES, PRECISION FINISHING, PROCESSING, PRODUCTION, SHEETS, STEEL, SURFACE PROPERTIES, TEMPLATES, TITANIUM ALLOYS (U)

A PROCESS STUDY, OUTLINING THE CAPABILITIES AND LIMITATIONS OF CHEMICAL MILLING, THE MATERIALS FOR WHICH IT IS SUITABLE, THE ACCURACIES AND SURFACE FINISHES EXPECTED; DERIVED FROM A STUDY OF THE AVAILABLE LITERATURE AND VISITS TO USERS OF THE PROCESS, ARE MADE TO DETERMINE THE APPLICABILITY OF THE METHOD TO THE PILOT PRODUCTION REQUIREMENTS OF WATERVLIET ARSENAL. FORTY-TWO POUNDS OF 4340 STEEL WERE REMOVED FROM A 90MM M41 BREECH RING IN 61 HOURS BY CHEMICAL MILLING. SURFACE FINISH WAS 62 MICROINCHES. METAL REMOVAL RATE WAS .0007 IN. PER MINUTE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-256 351

PENNSYLVANIA STATE UNIV UNIVERSITY PARK

INFLUENCE OF DISPLACIVE-SHEARING STRESSES ON THE
KINETICS OF RECONSTRUCTIVE TRANSFORMATIONS EFFECTED
BY PRESSURE IN THE RANGE 0-100,000 BARS (U)

IV DACHILLE, FRANK ROY, RUSTUMI

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *PHASE STUDIES,
*TRANSFORMATIONS, CHEMICAL BONDS, CHEMICAL ENGINEERING,
PRESSURE, REACTION KINETICS, SHEAR STRESSES,
TEMPERATURE (U)

EARLIER RESULTS SHOWED THAT ORDINARY LABORATORY GRINDERS AND MIXERS WERE ABLE TO CONVERT SEVERAL PHASES (E.G. PbO_2 , MnF_2 , CaCO_3 , BeF_2 , ETC.) INTO THEIR RESPECTIVE HIGH-PRESSURE FORMS WHICH, AT EQUILIBRIUM REQUIRE 10-15,000 ATMOSPHERES AT ROOM TEMPERATURE. HENCE, EXPERIMENTS WERE DEVISED TO ATTEMPT TO SEPARATE THE EFFECT OF HYDROSTATIC PRESSURE FROM THOSE OF SHEARING STRESSES AND BOND-BREAKAGE. A STUDY OF THE INFLUENCE OF SHEARING STRESSES SUPERIMPOSED UPON QUASIHYDROSTATIC PRESSURES OF UP TO 100,000 BARS AT TEMPERATURES BELOW 550 C WAS MADE POSSIBLE BY THE DEVELOPMENT OF SIMPLE APPARATUS. THIS CONSISTS OF THE BRIDGMAN UNIAXIAL-TYPE APPARATUS, WITH A PROVISION FOR CONTINUOUS ROTATION OF THE BOTTOM PISTON VERY SLOWLY BACK AND FORTH THROUGH A 2 DEGREE ARC. THE SAMPLE IS HEATED EXTERNALLY; DISPLACIVE-SHEARING RUNS WITH PRESSURE AND TEMPERATURE AUTOMATICALLY CONTROLLED CAN BE MADE FOR PERIODS EXCEEDING SEVERAL DAYS IF DESIRED. THE RESULTS CLEARLY SEPARATE THE INFLUENCE OF HYDROSTATIC PRESSURE ITSELF UPON REACTION RATES FROM THE EFFECT OF THE ADDED DISPLACIVE-SHEARING STRESSES. FROM THE RESULTS IT BECOMES CLEAR THAT EQUILIBRIUM RELATIONS BETWEEN PHASES ARE NOT ALTERED BY THE SHEARING STRESSES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-261 959

AEROJET-GENERAL CORP SACRAMENTO CALIF

STRUCTURAL TESTS OF A CHEMICALLY MILLED LADISH D-6AC
STEEL SECOND-STAGE MINUTEMAN AFT CLOSURE (U)

JUL 61 1V THOMAS, R.W.;
CONTRACT: AF33 600 36610

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *ROCKET CASES,
DEFORMATION, DESIGN, GUIDED MISSILES, HYDROSTATIC
PRESSURE, MEASUREMENT, MECHANICAL PROPERTIES,
PROCESSING, ROCKET MOTORS, STAGING, STEEL, STRESSES,
SURFACE-TO-SURFACE, TESTS (U)
IDENTIFIERS: MINUTEMAN (U)

A STUDY WAS MADE TO DETERMINE IF THE STRUCTURAL
STRENGTH REQUIREMENTS FOR THE AFT CLOSURE OF THE
SECOND-STAGE MINUTEMAN ENGINE COULD BE MET WITH
REDUCED-WEIGHT, CHEMICALLY MILLED CLOSURE OF LADISH
D-6AC STEEL. THE STUDY INDICATED THAT THE
CHEMICALLY MILLED AFT CLOSURE, WHICH WEIGHED 60 LB
LESS THAN THE CONVENTIONAL STEEL CLOSURE, HAD
SATISFACTORY STRUCTURAL STRENGTH. THE STRUCTURAL
TESTS WERE MADE WITH AN AFT CLOSURE OF THE
PRELIMINARY FLIGHT RATING TEST (PFRT)
DESIGN. THE CLOSURE WAS CHEMICALLY-MILLED TWICE TO
REDUCE THE THICKNESS OF PART OF THE SHELL, THE NOZZLE
BOSSES, AND THE BOLTED JOINT. STRESSCOAT WAS
APPLIED TO THE AFT CLOSURE AND THE UNIT WAS
HYDROSTATICALLY TESTED AFTER EACH MILLING OPERATION.
AN ANALYSIS OF STRESS AND STRAIN DATA INDICATED
THAT THE REDUCED-WEIGHT CLOSURE SATISFACTORILY
WITHSTOOD A PRESSURE OF 600 PSIG AND WILL MEET
ULTIMATE STRENGTH DESIGN CRITERIA. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-262 184

NORTHROP AIRCRAFT INC HAWTHORNE CALIF

DEVELOPMENT OF IMPROVED METHODS, PROCESSES, AND
TECHNIQUES FOR PRODUCING STEEL EXTRUSIONS

(U)

JUN 61 IV CHRISTENSEN, L.M. ROSE, W.I.
REPT. NO. NOR 61 199
CONTRACT: AF33 600 36713

UNCLASSIFIED REPORT

DESCRIPTORS: *AIRFRAMES, *EXTRUSION, *STEEL, CHEMICAL
MILLING, CORROSION-RESISTANT ALLOYS, DIES, DIFFUSION,
DRAWING (MACHINE PROCESSING), GLASS, HARDNESS, HEAT
TREATMENT, LUBRICANTS, MANUFACTURING METHODS, MECHANICAL
PROPERTIES, MICROSTRUCTURE, NICKEL, PLATING, PROCESSING,
SURFACE PROPERTIES, TENSILE PROPERTIES (U)
IDENTIFIERS: B-70 AIRCRAFT (U)

DIMENSIONAL INTEGRITY AND SURFACE QUALITIES
OBTAINED IN THE 0.06-IN. TEE SECTIONS OF PHASE
I ARE CONSIDERED SUFFICIENT FOR PROCEEDING TO
PHASE II. LOW AND ERRATIC MECHANICAL
PROPERTIES WERE NOTED IN THE EVALUATION OF PHASE
I EXTRUSIONS IN BOTH H-11 AND PH 15-7MO
MATERIALS. METALLURGICAL STUDIES INDICATED THAT
THESE LOW PROPERTIES RESULTED FROM DIFFUSION OF THE
NICKEL LUBRICANT MATERIAL INTO THE SURFACE OF THE
EXTRUSIONS. AFTER REMOVAL OF THE CONTAMINANT
COATING BY CHEMICAL ETCHING, THE RESULTANT MECHANICAL
PROPERTIES WERE WELL WITHIN SPECIFICATIONS FOR THE
MATERIALS. THE CHEMICAL ETCHING ALSO YIELDS
IMPROVED SURFACE QUALITY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-264 685

GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

TITANIUM DEVELOPMENT PROGRAM. VOLUME IV.

(U)

MAY 61 IV LANGLOIS, A.P. | MURPHY, J.F. | GREEN,

E.D.;

CONTRACT: AF33 600 34876

MONITOR: ASD TR617 576

UNCLASSIFIED REPORT

DESCRIPTORS: *ALLOYS, *JOINTS, *MANUFACTURING METHODS,
*TITANIUM ALLOYS, AIRPLANE ENGINE DUCTS, AIRPLANE
PANELS, ALUMINUM ALLOYS, BOLTED JOINTS, BRAZING,
CHEMICAL MILLING, CONFIGURATION, DESIGN, FUSELAGES, HEAT
TREATMENT, MATERIALS, MOLYBDENUM ALLOYS, PROCESSING,
RIVETED JOINTS, SMALL TOOLS, SPOT WELDS, STIFFENED
CYLINDERS, TAILS (AIRCRAFT), TORPEDO COMPONENTS,
VANADIUM ALLOYS, WELDING, WELDS, WINGS (U)

CONTENTS: MANUFACTURING METHOD DEVELOPMENT
DEVELOPMENT OF OPTIMUM OPERATIONAL SEQUENCING
PROCESS DEVELOPMENT CHEMICAL MILLING
TOOLING CONCEPTS ROOM TEMPERATURE FORM -
FURNACE HOT SIZE AND AGE ROOM TEMPERATURE
FORM - HEATED PRESS HOT SIZE - FURNACE AGE
SHORT CYCLE HOT FORM - AGE SEQUENCE TOOL
MATERIALS PARTS MANUFACTURE TAIL CONE
LEADING EDGE CANTED FUSELAGE BULKHEAD
ASSEMBLIES ENGINE BLEED AIR DUCTS PANELS (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-265 701

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING
METALS (CHAPTER VII) (U)

IV POPILOV, L. YA.:

UNCLASSIFIED REPORT

DESCR PTORS: *METALS, *PROCESSING, BRAZING, CHEMICAL
MILLING, ELECTRODEPOSITION, ELECTROEROSIVE MACHINING,
ELECTROLYTIC POLISHING, ELECTROPLATING, HEAT TREATMENT,
HEATING, PICKLING, SINTERING, SOLDERING, SPARK
MACHINING, TECHNOLOGICAL INTELLIGENCE, TRANSLATIONS (U)
IDENTIFIERS: USSR (U)

ELECTROCHEMICAL METHODS OF ELECTROPLATING AND
ELECTROCHEMICAL POLISHING ARE DEMONSTRATED.
CHEMICAL MILLING AND METAL HEATING PROCESSES ARE
DISCUSSED. HEAT TREATING OF STEEL BY CONTACT
ELECTROHEATING (N. V. GEVELING'S METHOD), HEATING
IN ELECTROLYTES (I. Z. YASNOGODSKIY'S METHOD),
AND SURFACE FLAME HARDENING ARE ALSO DISCUSSED. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-267 806

METAL HYDRIDES INC BEVERLY MASS

DEC 61 IV

CONTRACT: DA91 591EUC1722

UNCLASSIFIED REPORT

DESCRIPTORS: *COPPER, ACETIC ACIDS, CADMIUM, CHEMICAL MILLING, CHLORIDES, CRYSTALLIZATION, DISKS, FEASIBILITY STUDIES, HEATING, IRON COMPOUNDS, MELTING, NITRIC ACID, PHOSPHORIC ACIDS, PRODUCTION, SHEETS, SINGLE CRYSTALS, SPACE NAVIGATION, TEST METHODS (U)

A METHOD WAS DEVELOPED FOR PRODUCING A STACK OF CU SINGLE CRYSTAL DISKS 50-MICRONS THICK WHICH UTILIZED THE SPARK PLANNING TECHNIQUE FOLLOWED BY CHEMICAL POLISHING. THE METHOD FOR PROCESSING 35- TO 50-MICRON THICK DISKS IS AS FOLLOWS: (1) GROW 2.5-MM THICK SLABS AS BIG AS POSSIBLE, (2) SPARK-TEPAN 1-CM DIAM DISCS AND SPARK PLANE TO 75 TO 100 MICRONS THICK, AND (3) CHEMICALLY THIN TO 35 TO 50 MICRONS. ATTEMPTS TO GROW SINGLE CRYSTAL CU DISKS RESULTED IN THE FORMATION OF POLYCRYSTALLINE SHEETS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-268 033

AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS

A NOTE ON SEMICONDUCTOR DEVICE FABRICATION (U)

AUG 61 1V BERMAN, I. I
REPT. NO. 729

UNCLASSIFIED REPORT

DESCRIPTORS: ALLOYS, BONDING, CHEMICAL MILLING,
ELECTROEROSIVE MACHINING, GERMANIUM COMPOUNDS, HEATING,
IMPURITIES, INTERMETALLIC COMPOUNDS, PICKLING
COMPOSITIONS, PLATING, PRODUCTION, SEMICONDUCTORS,
SILICON COMPOUNDS, TEST METHODS (U)

A DISCUSSION IS PRESENTED OF THE BASIC STEPS IN THE
MAKING OF GE AND SI JUNCTION DEVICES. IT
INCLUDES A LIST OF THE COMMON ETCHANTS WITH THEIR
RELATION TO VARIOUS PHASES OF DEVICE FABRICATION.
CONSIDERATION IS GIVEN TO ALLOYING FOR JUNCTIONS
AND OHMIC CONTACTS, AS WELL AS INFORMATION ON
APPLYING THE DOPANT ALLOY. ELECTROLESS NI OR
AU GOLD, FURNACE FIRING, AND PLATING ARE EXAMINED
IN VIEW OF REQUIRED MODIFICATIONS. (AUTHOR) (U)

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AD-269 209

BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND
TITANIUM ALLOY TECHNOLOGY

(U)

DEC 61 1V WOOD, R.A. :
REPT. NO. M144

UNCLASSIFIED REPORT

DESCRIPTORS: *METALLURGY, *SHEETS, *TITANIUM ALLOYS,
AIR, ANTIOXIDANTS, CHEMICAL MILLING, COATINGS,
CONTAMINATION, CORROSION INHIBITION, EXTRUSION, GASES,
HIGH-TEMPERATURE RESEARCH, IGNITION, IMPURITIES,
MANUFACTURING METHODS, MECHANICAL PROPERTIES, OXIDATION,
PROCESSING (U)

A STUDY OF THE AIR CONTAMINATION AND PROTECTION FOR
4 DOD TI SHEET ALLOYS INDICATED THAT TI-
4AL3MO-1V AND TI-6AL-4V HAD ABOUT EQUAL
RESISTANCE TO PENETRATION BY INTERSTITIAL
CONTAMINANTS. THE HARDNESS PENETRATION TESTS
SHOWED TI-13V-11CR-3AL AND TI-2.5AL-16V
ALLOYS HAD LOWER RESISTANCE TO CONTAMINATION IN THAT
ORDER. THE TI-5AL-2.5SN, TI-6AL-4V,
AND TI-13V-11CR-3AL ALLOYS WERE EVALUATED
FOR SUSCEPTIBILITY TO H EMBRITTLEMENT INDUCED BY
CHEMICALLY MILLING IN A HYDROFLUORIC ACID BATH.
THE ALL-ALPHA TI-5AL2.5SN ALLOY WAS NOT
EMBRITTLED. THE TI-6AL-4V ALLOY WAS ONLY
SLIGHTLY EMBRITTLED, WHILE THE TI-13V-11CR-
3AL ALLOY WAS SEVERELY EMBRITTLED. AN
INVESTIGATION CONCERNING THE TITANIUM-LOX REACTION
WAS CONDUCTED BY USING HIGH-PRESSURE GASEOUS O.
THE STUDY ESTABLISHED THAT A FRESH TI SURFACE
WOULD REACT WITH GASEOUS O UNDER ABOUT 100-PSIG
PRESSURE BETWEEN -250 F AND ROOM TEMPERATURE.
SEVERAL METHODS OF PRODUCING FLAT SOLUTION-TREATED
TITANIUM ALLOY SHEET ARE REVIEWED AND A NEW CONCEPT
IS DESCRIBED. BASICALLY, THE NEW METHOD INVOLVES
HEATING AND COOLING THE SHEET UNDER TENSION.
(AUTHOR)

(U)

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AD-271 167

BOEING CO WICHITA KANS WICHITA DIV

BOEING-WICHITA MATERIALS AND RESEARCH DEVELOPMENT
PROGRAMS, 1957-1961

(U)

SEP 61 IV POE, A.H.; SHIGLEY, H.E.;
CONTRACT: AF33 616 8141

UNCLASSIFIED REPORT

DESCRIPTORS: *AIRFRAMES; *MATERIALS; *RADOMES;
ADHESIVES; ALLOYS; ALUMINUM; BONDING; BRAZING; CADMIUM;
CERAMIC COATINGS; CERAMIC MATERIALS; CHEMICAL MILLING;
COMPOSITE MATERIALS; HEAT-RESISTANT PLASTICS; HIGH-
TEMPERATURE RESEARCH; IGNITION; JET ENGINE FUELS;
LAMINATES; LUBRICANTS; MACHINING; MANGANESE; METAL
JOINTS; METALS; ORGANIC COATINGS; PLASTICS; PLATING;
POLYMERS; STAINLESS STEEL; TEXTILES; TITANIUM;
VARNISHES

(U)

CONTENTS: IRON AND STEEL; AM 350 STAINLESS
STEEL; CHEMICAL ETCHING; LIGHT METALS AND ALLOYS;
TI FASTENERS (6AL-4V); VACUUM PLATED AL;
CORROSION RESISTANCE OF VARIOUS ALUMINUMS; HEAVY
NON-FERROUS METALS AND ALLOYS; VACUUM PLATED CD;
ELECTROPLATED MN; PLASTICS; METAL BONDING
MATERIALS; ADHESIVES; PARAPLAST 33; EPOXY TUBING;
3M-471 PLASTIC TAPE; EPOXY MOLD DIE; LIQUID
AND SEMI-SOLID HIGH POLYMERS; ADHESIVES; HIGH
TEMPERATURE LUBRICANTS; ENAMELS AND LACQUERS; EPOXY
ORGANIC COATINGS; NEOPRENE ORGANIC COATING; FIBROUS
AND FILAMENTARY MATERIALS; INVESTIGATION OF
FABRICS FOR LINT FREE CONDITION; COMPOSITE
MATERIALS; CERAMIC BRAZE; EPON 828 AND 143 GLASS
FABRIC LAMINATES; 181 VOLAN AND 181-A-1100 SILANE
FINISH FABRIC; REINFORCED LASTICS FOR RADOMES;
DECALS.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-271 536

DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING

(U)

JAN 62 1V JAMIESON, J.L.; LOCKHART, F.J.;
CONTRACT: AF33 600 43027
MONITOR: ASD TR7 648 V1

UNCLASSIFIED REPORT

DESCRIPTORS: *ALLOYS, *CHEMICAL MILLING, *METALS,
*REFRACTORY MATERIALS, AIRCRAFT, ALUMINUM ALLOYS,
CARBOXYMETHYLCELLULOSE, CHEMICALS, CHROMIUM ALLOYS,
GELS, HEAT RESISTANT METALS + ALLOYS, MATERIALS,
MOLYBDENUM ALLOYS, NICKEL ALLOYS, NIOBIUM, POROUS
MATERIALS, PROCESSING, PRODUCTION, SOLIDS, SOLUTIONS,
STAINLESS STEEL, STEEL, STRUCTURES, TANTALUM, TITANIUM
ALLOYS, VANADIUM ALLOYS (U)

SEVERAL GEL SYSTEMS WERE PREPARED WITH ACID
SOLUTIONS SUSPENDED IN A GEL MATRIX OF ORGANIC, WATER
SOLUBLE RESINS. THESE GEL ETCHANTS CAN BE CAST
INTO SEMIRIGID SHAPES AND ARE STABLE AT TEMPERATURES
UP TO 140 TO 160 F. IN CONTACT WITH A STEEL
SURFACE, THE GEL ETCHANTS CHEMICALLY REACT AND REMOVE
METAL AT A CONTROLLED RATE. THE REACTION PRODUCTS
AND REACTANTS MIGRATE COUNTERCURRENTLY THROUGH THE
GEL MEDIA. FURTHER DEVELOPMENT AND TESTING WILL
DETERMINE APPLICABILITY AS NON-LIQUID ETCHANTS.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-271 965

METAL HYDRIDES INC BEVERLY MASS

INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE
TITANIUM DIBORIDE: METALLOGRAPHIC PROCEDURES AND
FINDINGS

(U)

NOV 61 IV LYNCH, C.T.; VAHLDIK, F.W.;
MONITOR: ASD TR61 350

UNCLASSIFIED REPORT

DESCRIPTORS: *BORIDES, *CRYSTALS, *SINGLE CRYSTALS,
*TITANIUM COMPOUNDS, ABRASIVES, CHEMICAL MILLING,
CRYSTAL STRUCTURE, ELECTROLYTIC POLISHING, GRINDERS,
GRINDING WHEELS, HIGH-TEMPERATURE RESEARCH, PREPARATION,
PROCESSING, REFRACTORY MATERIALS, SPECTROGRAPHIC
ANALYSIS

(U)

SINGLE-CRYSTAL AND POLYCRYSTALLINE TIB₂ WAS
EXAMINED TO DEVELOP APPLICABLE METALLOGRAPHIC
TECHNIQUES FOR SECTIONING, MOUNTING, GRINDING,
POLISHING, AND ETCHING OF TIB₂ SPECIMENS. THIS
WORK DEMONSTRATES THE USABILITY AND PRACTICABILITY OF
USING VARIOUS SIC PAPERS TOGETHER WITH DIFFERENT
GRADES OF DIAMOND PASTE ON POLISHING WHEELS IN
PREFERENCE TO USING CLOTHS. IT HAS BEEN FOUND THAT
H₂SO₄, AS A CONSTITUENT OF ETCHANTS, PRODUCES
MORE RELIABLE AND MORE CONSISTENT RESULTS THAN HF.
THE SAME IS TRUE OF H₂SO₄ WHEN USED AS A
CONSTITUENT OF ELECTROLYTES. SINGLE-CRYSTAL
TIB₂ WAS FOUND TO HAVE A TYPE OF WIDMANSTATTEN
STRUCTURE WHILE POLYCRYSTALLINE TIB₂ HAD A
NEEDLE-LIKE PATTERN. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-272 227

GENERAL DYNAMICS/FORT WORTH TEX

MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP
BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND
OXIDE FILM FORMATIONS OF - DETERMINATION OF (U)

JAN 62 1V PRATT, W.M.;
REPT. NO. FGT 2510
CONTRACT: AF33 600 36200

UNCLASSIFIED REPORT

DESCRIPTORS: *BRAZING, *HONEYCOMB CORES, *SANDWICH
PANELS, *STAINLESS STEEL, ALLOYS, CHEMICAL MILLING,
CLEANING, CONTROLLED ATMOSPHERES, COPPER ALLOYS,
ELECTRON DIFFRACTION ANALYSIS, FILMS, HEAT TREATMENT,
HYDROGEN, LITHIUM ALLOYS, OXIDES, PROCESSING, SILVER
ALLOYS, SPECTROGRAPHIC ANALYSIS, SURFACE PROPERTIES,
SURFACES, ULTRASONIC RADIATION (U)

BRAZING FLOW TESTS WERE RUN ON 17-7PH .0015
IN. THICK STAINLESS STEEL SPECIMENS, USING THE 92.8-7-
C.2 AG-CU-LI BRAZING ALLOY. SPECTROPHOTOMETRIC MEASUREMENTS, ELECTRON
DIFFRACTION STUDIES, AND FERRIC CHLORIDE ETCH TESTS
REVEALED DIFFERENCES IN COLOR AND REFLECTANCE,
COMPOSITION, THICKNESS, PHYSICAL CHARACTERISTICS, AND
ETCHING OF THE SURFACES OF SPECIMENS HAVING A
DIFFERENT ANNEALING HISTORY. FLOW RESPONSE OF 17-
7PH FOIL UNDER CONDITIONS OF CAPILLARITY CAN BE
DETERMINED BY A SANDWICH FLOW TEST. WHEN THE
MATERIAL WAS ANNEALED IN A HYDROGEN ATMOSPHERE OF
VERY LOW DEW POINT (-85 F), VERY GOOD ALLOY FLOW
WAS OBTAINED UPON BRAZING UNDER CAPILLARY CONDITIONS
OF THE SANDWICH FLOW TEST. LIMITED SANDWICH FLOW
TESTING OF THE ULTRASONICALLY CLEANED SPECIMENS GAVE
EXCELLENT IMPROVEMENT IN BRAZING RESPONSE FOR DEW
POINTS RANGING FROM -30 TO 41 F. AD- 72 2 9
SPONSE OF 17-7PH FOIL UNDER CONDITIONS OF
CAPILLARITY CAN BE DETERMINED BY A SANDWICH FLOW
TEST. WHEN THE MATERIAL WAS ANNEALED IN A HYDROGEN
ATMOSPHERE OF VERY LOW DEW POINT (-85 F), VERY
GOOD ALLOY FLOW WAS OBTAINED UPON BRAZING UNDER
CAPILLARY CONDITIONS OF THE SANDWICH FLOW TEST.
LIMITED SANDWICH FLOW TESTING OF THE ULTRASONICALLY
CLEANED SPECIMENS GAVE EXCELLENT IMPROVEMENT IN
BRAZING RESPONSE FOR DEW POINTS RANGING FROM -30 TO
41 F. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-272 526

MCDONNELL AIRCRAFT CORP ST LOUIS MO

MOLYBDENUM STRUCTURAL COMPONENT PROGRAM

(U)

FEB 62 12P

CONTRACT: N0W-61-0653

UNCLASSIFIED REPORT

DESCRIPTORS: •COATINGS, •MOLYBDENUM ALLOYS, •RIVETS, AIRFRAMES, ALUMINUM COATINGS, ANTIOXIDANTS, BOLTED JOINTS, BOLTS, CHEMICAL MILLING, CHROMIUM COMPOUNDS, COMPATIBILITY, COMPOSITE MATERIALS, DESIGN, FORGING, HIGH-TEMPERATURE RESEARCH, LOCKING FASTENER DEVICES, METAL COATINGS, METAL JOINTS, MOLYBDENUM, NIOBIUM, REFRACTORY COATINGS, RIVETED JOINTS, SILICON COATINGS, SPACECRAFT, STRUCTURES, TEMPLATES, TITANIUM ALLOYS, ZIRCONIUM ALLOYS (U)

PROGRESS IS REPORTED ON THE MO STRUCTURAL COMPONENTS. COATING VENDORS WERE INTERVIEWED TO DETERMINE THE MOST ECONOMICAL DESIGN AND ASSEMBLY PROCEDURE FOR THE RUDDER FROM A COATING STANDPOINT. COMPATIBILITY STUDIES OF MO-COATED AND NB-COATED PARTS WERE COMPLETED. PRE-PRODUCTION MO MATERIAL WHICH COULD BE USED FOR PRELIMINARY EVALUATION WAS SELECTED FOR ROLLING FOR THE DETAIL FABRICATION EVALUATION. THE RUDDER FITTINGS CANNOT BE MADE AS MO OR NB FORGINGS UNDER WESTINGHOUSE OR CRUCIBLE STEELS STUDY PROGRAM. THE BLANKING OF MO PARTS BY CHEM-MILLING WAS INVESTIGATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-276 887

ALLOY ENGINEERING AND CASTING CO CHAMPAIGN ILL

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE (U)

MAY 62 10P KIRSHENBAUM, N.W.;
CONTRACT: N0W-61-0656

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTALS, *FATIGUE (MECHANICS),
*FLUORIDES, *LITHIUM COMPOUNDS, CHEMICAL MILLING,
ELECTRON BEAMS, HEAT TREATMENT, PHYSICAL PROPERTIES,
PICKLING, PROCESSING, RADIATION EFFECTS, ROLLING MILL (U)

CHEMICAL POLISHING OF LIF CRYSTALS USING HBF₄
WAS UNSATISFACTORY. POLISHING UNANNEALED
IRRADIATED CRYSTALS IN AGITATED SOLUTIONS OF 2 TO
5% NH₄OH WAS PROMISING. AN AQUEOUS SOLUTION
OF 1.5×10^{-4} TO THE -4 TH POWER M FEF₃ WAS
SUPERIOR TO FECL₃ AS AN ETCHANT MEDIUM.
CLEAVAGE OF LIF CRYSTALS AT LIQUID N
TEMPERATURE APPARENTLY DECREASED BRITTLINESS.
CLEAVED CRYSTALS ANNEALED BETWEEN 350 AND 500 C
SHOWED EVIDENCE OF THERMAL ETCHING. HIGH VOLTAGE
ELECTRON IRRADIATION OF LIF CRYSTALS PRODUCED
ATOMISTIC EFFECTS SIMILAR TO GAMMA IRRADIATION.
IRRADIATED CRYSTALS WERE CLEAVED WITH LESS EFFORT
AND DEFORMATION THAN THE AS-RECEIVED CRYSTALS. A
TECHNIQUE FOR OBSERVING DISLOCATIONS INTRODUCED BY
ROLLING WAS DEVISED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-278 526

AERONCA MFG CORP MIDDLETOWN OHIO

BERYLLIUM COMPOSITE STRUCTURES. VOLUME II. MATERIALS
AND PROCESSES (U)

MAY 62 IV KRUSOS, J.N.; KJELBY, A.S.:
REPT. NO. TR61 706 V2
CONTRACT: AF33 616 7050
MONITOR: ASD TR61 706 V2

UNCLASSIFIED REPORT

DESCRIPTORS: AEROSPACE CRAFT, ALLOYS, ALUMINUM
COMPOUNDS, BRAZING, CERAMIC MATERIALS, CHEMICAL MILLING,
DIOXIDES, FOAMS, FOILS, HEAT SHIELDS, HIGH-TEMPERATURE
RESEARCH, HONEYCOMB CORES, MANUFACTURING METHODS, METAL
PLATES, OSRD, OXIDES, REINFORCING MATERIALS, SHEETS,
SHIELDING, SILICON COMPOUNDS, STAINLESS STEEL, TESTS,
THERMAL INSULATION, ZIRCONIUM COMPOUNDS (U)

THE METHODS DEVELOPED FOR FABRICATION OF BE SHEET
COMPOSITE STRUCTURES ARE DESCRIBED. DESCRIPTIONS
AND PERFORMANCE EVALUATION ARE INCLUDED FOR A VARIETY
OF PANELS FABRICATED UNDER THE CONTRACT CONSISTING OF
BE LOAD BEARING PANELS AND POROUS CERAMIC HEAT
SHIELDS DEVELOPED TO WITHSTAND TEMPERATURES IN EXCESS
OF 3000 F. CONCEPTS ARE OUTLINED DEFINING
APPLICATION OF BE-CERAMIC COMPOSITES TO AEROSPACE
VEHICLE STRUCTURES. BE SHEET FABRICATION METHODS
AND TOOLING ARE DESCRIBED AND INCLUDE SUCH PROCESSES
AS CUTTING, FORMING, CHEM-MILLING, AND BRAZING. BE
SHEET FACES WERE BRAZED TO A VARIETY OF SUPERALLOY
AND STAINLESS STEEL HONEYCOMB CORES. THREE BASIC
POROUS CERAMIC FOAMS WERE DEVELOPED IN THE HEAT
SHIELD: AL₂O₃, ZR₂O₂, AND SiO₂.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-281 843

HARRY DIAMOND LABS WASHINGTON D C

MICROCIRCUITRY BY CHEMICAL DEPOSITION.

(U)

JUN 62

47P

HEBB, EMMA LEE :

REPT. NO. TR-1052

PROJ: 96392

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *METAL FILMS,

*MICROMINIATURIZATION (ELECTRONICS), *RESISTORS,

*SUBMINIATURE ELECTRONIC EQUIPMENT, CHEMICAL MILLING,

COPPER, FILMS, MANUFACTURING METHODS, NICKEL, NICKEL

ALLOYS, PHOSPHORUS ALLOYS, PLATING

(U)

IDENTIFIERS: THIN FILMS, THIN FILMS

ELECTRONICS

(M)

TECHNIQUES FOR CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND FOR ETCHING PATTERNS IN THIN CU CONDUCTORS, WERE COMBINED AND MODIFIED TO PERMIT THE FABRICATION OF NI ALLOY THIN FILMS IN VARIED AND CONTROLLED GEOMETRIES. THE RESISTIVITIES OF THE FILMS PRODUCED WERE VARIED FROM A FEW OHMS PER SQUARE TO SEVERAL THOUSAND OHMS PER SQUARE, BUT, AT PRESENT, TOLERANCES ON REPRODUCIBILITY LIMIT THE WORKING RANGE TO A MAXIMUM OF ABOUT 500 OHMS PER SQUARE. RESISTIVE AND CONDUCTIVE PARTS MADE OF NICKEL ALLOY FILMS OF APPROXIMATELY 500 OHMS PER SQUARE HAVE BEEN EMPLOYED IN MICROCIRCUITS IN WHICH THE TOLERANCES ON RESISTANCE VALUES ARE ABOUT + OR - 30%.

ALTHOUGH VARIATIONS IN FILMS RESISTIVITY BETWEEN BATCHES SOMETIMES EXCEEDS THESE TOLERANCES, THE CLOSE AGREEMENT AMONG FILMS FROM THE SAME BATCH AND THE ABILITY TO MEASURE RESISTIVITIES PRIOR TO COMMITTING FILMS TO CIRCUIT PRODUCTION ALLOWED SUCH CIRCUITS TO BE FABRICATED. MODIFICATIONS OF PROCEDURES TO INCREASE THE REPRODUCIBILITY OF RESISTANCE VALUES ARE BEING INVESTIGATED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0ML6

AD-282 017

MARTIN CO BALTIMORE MD

THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: REPT. FOR JAN 60-JAN 61, ON RESEARCH ON NEW CHEMICAL SYSTEMS AND METHODS OF SYNTHESIS.

APR 61 20P

CONTRACT: AF33 616 6220

PROJ: 7023

MONITOR: WADD TR-61-58-PT-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*METALLIC CRYSTALS), (*SINGLE CRYSTALS), SURFACE PROPERTIES, SHEAR STRESSES, WETTING AGENTS, STEARIC ACIDS, METALLIC SOAPS, ADSORPTION, MECHANICAL PROPERTIES, CHEMICAL MILLING, ALUMINUM (U)

SINGLE CRYSTALS OF AL WERE PULLED IN TENSION IN A SOLUTION OF PARAFFIN OIL AND STEARIC ACID. THE CRITICAL RESOLVED SHEAR STRESS DID NOT CHANGE WITH THE CONCENTRATION OF THE STEARIC ACID SOLUTION; HOWEVER, THE EXTENT AND SLOPES OF STAGES I AND II WERE AFFECTED GREATLY. THE OBSERVATIONS LEND EVIDENCE THAT THE WEAKENING EFFECT OF SURFACE-ACTIVE AGENTS IS CONTROLLED BY THE RATE OF DESORPTION OF THE METAL SOAP FORMED BY THE REACTION OF THE SURFACE-ACTIVE AGENT AND THE METAL SURFACE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-282 920

DOUGLAS AIRCRAFT CO. INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING

(U)

NOV 61 IV CADY, J.R. JAMIESON, J.L.

REPT. NO. 1111

CONTRACT: AF19 604 4556

MONITOR: AFRL 1111

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *GELS, *METALS,
*STAINLESS STEEL, ACETATES, ACIDS, AIRCRAFT, ALLOYS,
CARBOXYLIC ACIDS, CELLULOSE ACETATES, CHEMICAL
PROPERTIES, CHEMICALS, CHLORIDES, COLLOIDS, HONEYCOMB
CORES, IRON COMPOUNDS, MATERIALS, MECHANICAL PROPERTIES,
METAL PLATES, METHANES (1 C), METHYL RADICALS, MOLDING,
PLASTICS, POROUS MATERIALS, PROCESSING, REAGENTS,
SOLIDS, SOLUTIONS, SURFACES, TESTS, VINYL RADICAL (U)

FURTHER DEVELOPMENT OF GEL SYSTEMS HAS IMPROVED
PHYSICAL, CHEMICAL AND MECHANICAL PROPERTIES.
MILLING METAL PLATE STOCK IS LIMITED BY THE AMOUNT
OF CHEMICAL ENERGY PRESENTLY AVAILABLE IN THE GEL.
STAINLESS STEEL HONEYCOMB WAS CHEMICALLY CONTOURED
WITH GOOD DIMENSIONAL CONTROL. POROUS SOLIDS
CARRYING LIQUID ETCHANTS FORMED PROFILE CUTS, BUT
TOLERANCE AND SURFACE FINISH NEED IMPROVEMENT.
COMPARATIVE TESTS WITH LIQUID AND NON-LIQUID
ETCHANTS DETERMINED PROBABLE LIMITS OF PERFORMANCE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-285 085

ALLOY ENGINEERING AND CASTING CO CHAMPAIGN ILL

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE (U)

AUG 62 17P HORDON, M.J.
CONTRACT: NOW-61-0656

UNCLASSIFIED REPORT

DESCRIPTORS: *DEFORMATION, *FATIGUE (MECHANICS),
*LITHIUM COMPOUNDS, CHEMICAL MILLING, CRYSTAL LATTICE
DEFECTS, CRYSTALS; ETHYLENES, FLUORIDES, FRICTION,
LOADING, NYLON, POLYMERS, PREPARATION, ROLLING MILLS,
SINGLE CRYSTALS, SPHERES, STRESSES, SURFACES (U)

SPHERES OF NYLON AND TEFLON MATERIAL WERE
ROLLED AT CONSTANT SPEED OVER A (001) SURFACE OF
CAREFULLY PREPARED CRYSTALS OF LIF UNDER APPLIED
LOADS RANGING FROM 1 TO 400 GMS. IN THE ROLLING
CONTACT APPARATUS. UNDER THE IMPACT OF THE
APPLIED LOAD, A NARROW DEFORMATION TRACK, REVEALED BY
A HIGH DISLOCATION ETCH PIT DENSITY, WAS LEFT IN THE
WAKE OF THE ROLLING SPHERE. WITHIN THE TRACK,
ETCH PITS WERE CLUSTERED IN LOCALIZED AREAS PROBABLY
CAUSED BY SUBMICROSCOPIC ASPERITIES IN THE SURFACES
OF CONTACT. ORTHOGONAL (110) SLIP BANDS WERE
GENERALLY OBSERVED TO BE ALIGNED PARALLEL AND NORMAL
TO THE ROLLING DIRECTION AT MODERATE STRESS LEVELS;
HOWEVER, AT HIGHER STRESSES, THE TWO OTHER AVAILABLE
SLIP SYSTEMS WERE ALSO OBSERVED. THE EXPERIMENTAL
LOAD DATA ARE GENERALLY IN GOOD AGREEMENT WITH
THEORETICAL CONSIDERATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-286 074

GENERAL DYNAMICS/FORT WORTH TEX.

WING - ALUMINUM SHEET AND PLATE - DYNAMIC ETCHED OR
CHEM-MILLED - MECHANICAL PROPERTIES - DETERMINATION
OF (U)

SEP 62 IV FARNER, H.B.:
REPT. NO. FGT 2100
CONTRACT: AF33 600 32841

UNCLASSIFIED REPORT

DESCRIPTORS: *ALUMINUM ALLOYS, *CHEMICAL MILLING,
FATIGUE (MECHANICS), MECHANICAL PROPERTIES, METAL
PLATES, PROCESSING, SHEETS, SURFACES, TENSILE
PROPERTIES, TEST METHODS, THICKNESS (U)
IDENTIFIERS: 7075 T ALUMINUM ALLOYS (U)

THE EFFECT OF CHEMICAL MILLING ON MECHANICAL
PROPERTIES OF 2024, 7075, 7079 AL ALLOYS WAS
DETERMINED. THE TENSILE STRENGTHS WERE AFFECTED AS
FOLLOWS: ALL THE 0.064 IN. GAGE 2024-T86 ALCLAD
ALUMINUM SHOWED STRENGTH LOSSES. BARE 1.50 IN.
GAGE 7075-T6 AND 7079-T6 ALUMINUM PLATE, SHOWED
STRENGTHS APPROXIMATELY 10% BELOW THE STRENGTH OF
THE CONTROL SPECIMENS. THERE WAS NO SIGNIFICANT
CHANGE IN THE MECHANICAL PROPERTIES WHEN THE .125
IN. THICK ALCLAD 2024-T86 WAS REDUCED TO 0.098 IN.
THICKNESS, THE 0.312 IN. THICK 2024-T86 AND 7075-
T6 WERE REDUCED TO 0.098 IN. THICKNESS, THE 1-1/2
IN. THICK 7075-T6 WAS REDUCED TO 0.030 IN.
THICKNESS, OR THE 1-1/2 IN. THICK 7079-T6 IN THE
LONGITUDINAL DIRECTION WAS REDUCED TO 0.030 IN.
THICKNESS. THE 7079-T6 IN THE TRANSVERSE DIRECTION
SHOWED A LOSS IN YIELD STRENGTH OF ABOUT 10%.
THE 0.312 IN. THICK 2024-T86 PLATE REDUCED TO
0.015 IN. THICKNESS, SHOWED A LOSS OF APPROXIMATELY
68% IN YIELD AND ULTIMATE STRENGTHS IN THE
TRANSVERSE DIRECTION. GENERALLY, ALL THE MATERIALS
SHOWED SOME LOSS OF DUCTILITY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-286 872

GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION
TECHNIQUES AND INCREASE THE RELIABILITY OF THE
2N1358A TRANSISTOR (U)

JUL 62 IV KUHNS, J.C.:
CONTRACT: DA36 D19SC86725

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRANSISTORS,
CHEMICAL MILLING, CRYSTALS, ELECTRIC CURRENTS,
GERMANIUM, GROWTH, INDIUM ALLOYS, LIFE EXPECTANCY,
MATERIALS, PROCESSING, RELIABILITY, SEMICONDUCTORS,
TEMPERATURE, TEST EQUIPMENT, TEST METHODS, THERMAL
STRESSES (U)

EFFORTS WERE MADE TO IMPROVE THE RELIABILITY OF
2N1358A TRANSISTORS BY IMPROVEMENT OF
MANUFACTURING TECHNIQUES INCLUDING EQUIPMENT AND
PROCESS MODIFICATIONS, RELIABILITY TESTS, FAILURE
ANALYSIS AND ANALYTICAL-EMPIRICAL SURFACE STUDIES.
THE WAFER FLASH-ETCH WAS INCORPORATED IN THE ALLOY
AREA TO MINIMIZE THE TIME BETWEEN ETCH AND ALLOY.
ALL OF THE GERMANIUM WAFERS FOR 2N1358 TYPE
TRANSISTORS ARE CURRENTLY BEING SLICED BY THE
INTERNAL SAWING METHOD. THE MAJOR RELIABILITY
PROBLEMS ARE DEGRADATION OF THE COLLECTOR DIODE DUE
TO SURFACE CONTAMINATION; EMITTER DIODE DEGRADATION
DUE TO SURFACE DEFECTS; AND HIGH FLOATING POTENTIAL
DUE TO FRACTURING OF SPUR REGROWTH AT THE COLLECTOR
PERIPHERY. THE RESIDUAL GAS ANALYSIS HAS
INDICATED ON ALL UNITS TESTED THE PRESENCE OF WATER
VAPOR (POSSIBLY ADSORBED) BEYOND WHAT WAS EXPECTED
IN VIEW OF THE BAKING AND DRY AIR CAPPING PROCEDURE
IN PRODUCTION. THIS, IN CONJUNCTION WITH
INDICATIONS OF ADSORBED GAS IN NICKEL PLATED PARTS,
AND THE RESULTS OF BAKE-OUT RECOVERY TECHNIQUES ON
DEGRADED COLLECTOR DIODES, PROVIDES CLUES AND
SUGGESTS EXPERIMENTS TO DETERMINE CORRECTIVE ACTION
FOR THE COLLECTOR DIODE DEGRADATION PROBLEM. (U)
AUTHOR) AD-286 8729N2 +++THE RELIABILITY OF
THE 2N1358A TRANSISTOR BY IMPROVEMENT OF
MANUFACTURING TECHNIQUES INCLUDING EQUIPMENT AND
PROCESS MODIFICATIONS, RELIABILITY TEST, FAILURE
ANALYSIS AND ANALYTICAL-EMPIRICAL SURFACE STUDY. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-286 886

GENERAL ELECTRIC CO SCHENECTADY N Y

SILICON PLANAR EPITAXIAL TRANSISTOR TYPE 2N2193 (U)

JUL 62 IV JOHNSON, S.O.I

CONTRACT: DA36 039SC86727

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, ALLOYS, ALUMINUM ALLOYS, BORON COMPOUNDS, CHEMICAL MILLING, DIFFUSION, ELECTRIC POTENTIAL, ELECTRODES, EVAPORATION, FAILURE (MECHANICS), GASES, HEATING, HUMIDITY, HYDROGEN, INFRARED LAMPS, LIFE EXPECTANCY, MANUFACTURING METHODS, MATERIALS, NITROGEN, PHOSPHORUS, PROCESSING, RELIABILITY, SEMICONDUCTORS, SILICON, TEMPERATURE, TESTS, THERMAL STRESSES, TRANSONIC CHARACTERISTICS, VIBRATION (U)

CONTENTS: IMPROVED KPR RESOLUTION CONTACT
EVAPORATION AND ALLOYING COLLECTOR ETCHING BORON
DIFFUSION PHOSPHORUS DIFFUSION COLLECTOR CONTACT
TO THE HEAD R INTERSECTIONS RELIABILITY MEASUREMENT FAILURE ANALYSIS (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZQML6

AD-286 907

PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS
IMPROVEMENT

(U)

JUL 62 IV. SANDERS, J.;
REPT. NO. R 232 1
CONTRACT: DA36 039SC06720

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS), (*MANUFACTURING
METHODS), RELIABILITY, STRESSES, STORAGE,
OPERATION, ENCAPSULATION, ELECTRODES,
TEMPERATURE, SEALS(STOPPERS), DEGASIFICATION,
CHEMICAL MILLING, HIGH-TEMPERATURE RESEARCH,
PRODUCTION

(M)

A PRODUCTION ENGINEERING MEASURE WAS STUDIED FOR
IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE
RELIABILITY FOR THE JET ETCH TRANSISTOR TYPE
2N501A, WITH A MAXIMUM OPERATING FAILURE RATE OF
0.01% PER 1000 HOURS AT A 90% CONFIDENCE LEVEL AT
25 C AS AN OBJECTIVE. EFFORTS WERE MADE TO
IMPROVE THE FOLLOWING SEVEN MANUFACTURING PROCESSES:
(1) PLATING EDGE DEFINITION, (2) HIGHER
TEMPERATURE ALLOYS, (3) LEAD ATTACHMENTS
(INCLUDES COLLECTOR ATTACHMENTS), (4)
CONTROLLED FORMATION OF SURFACE OXIDES FOR SURFACE
STABILIZATION, (5) GETTERING TECHNIQUES FOR
ENCAPSULATING AND SEALING, (6) THERMAL
DISSIPATION OF PACKAGE, AND (7) LEAK
DETERMINATION. ESTABLISHMENT OF A PILOT LINE TO
INCORPORATE THESE PROCESS IMPROVEMENTS IS REPORTED.
PRELIMINARY OPERATING STRESS DATA ON TRANSISTORS
FABRICATED ON THE PILOT LINE INDICATES AN
IMPROVEMENT IN POWER HANDLING CAPABILITY AS A RESULT
OF THE PROCESS IMPROVEMENTS COMPLETED. PROBLEMS
ASSOCIATED WITH OPERATING STRESS TESTING AND WITH
OBTAINING CORRELATION BETWEEN OPERATING STRESS
TESTING AND STORAGE STRESS TESTING ARE DISCUSSED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-287 594

IIT RESEARCH INST CHICAGO ILL

FIBER-REINFORCED METALS AND ALLOYS

(U)

OCT 62

6P

PARIKH, N.M. I

REPT. NO. B241 3

CONTRACT: NOW-62-0650

UNCLASSIFIED REPORT

DESCRIPTORS: *COMPOSITE MATERIALS, *METALS, *REINFORCING MATERIALS, ALLOYS, ALUMINUM ALLOYS, BERYLLIUM, CHEMICAL MILLING, FIBERS, FLUORIDES, GERMANIUM, GERMANIUM ALLOYS, HYDROGEN COMPOUNDS, MELTING, METALLIC TEXTILES, MICROSTRUCTURE, NITRIC ACID, POWDER METALS, SOLIDS, WIRE

(U)

BE FIBER-AG ALLOY MATRIX COMPOSITES WERE PREPARED FROM 0.0047 IN DIAM WIRES. ALTHOUGH THERE IS AN ETCHING EFFECT ON THE WIRE SURFACES DUE TO THE HIGH PROCESSING TEMPERATURES, THE BOND BETWEEN BE FIBER SURFACE AND AG MATRIX IS A COHERENT ONE. POWDERS WERE PREPARED BY METING AND ATOMIZATION. HE AL ALLOY MATRIX WS USED FOR PREPARING SOME EXTRUDED BARS FOR DETERMINING THE OPTIMUM HEAT TREATMENT CONDITIONS. ALL THESE COMPOSITES ARE BEING EVALUATED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-291 600

TEXAS INSTRUMENTS INC DALLAS

SILICON SEMICONDUCTOR NETWORKS MANUFACTURING
METHODS

(U)

NOV 62 IV LATHROP, J.W.; BROWER, W.C.;
REPT. NO. IR7 865 V6
CONTRACT: AF33 600 42210
MONITOR: ASD IR7 865 V6

UNCLASSIFIED REPORT

DESCRIPTORS: *SEMICONDUCTORS, *SILICON, *SUBMINIATURE
ELECTRONIC EQUIPMENT, BONDING, BRAZING, CHEMICAL
MILLING, CIRCUITS, CONTAINERS, DESIGN, DIFFUSION,
ELECTRON BEAMS, EVAPORATION, FILMS, GLASS, GROWTH, LEAD,
MATERIALS, MATHEMATICAL ANALYSIS, PROCESSING,
PRODUCTION, SWITCHING CIRCUITS, TEST EQUIPMENT, TEST
METHODS, VAPOR PLATING, WELDING

(U)

PROCESS STUDIES WERE CONCLUDED. TECHNIQUES HAVE
BEEN DEVELOPED FOR EVALUATION OF ALL DIFFUSION
PARAMETERS. ALL MACHINES FOR THE PILOT LINE ARE
EITHER COMPLETED, BEING CONSTRUCTED OR MODIFIED, OR
IN ADVANCED DESIGN STAGE. THE PHILOSOPHY GUIDING
CREATION OF THESE MACHINES IS THAT ALL POSSIBLE
OPERATIONS WILL BE PERFORMED ON THE FUNCTIONAL
ELECTRONIC BLOCKS WHILE THEY ARE STILL IN SLICE FORM.
THESE OPERATIONS INCLUDE CLEANING, POLISHING,
PHOTORESIST APPLICATIONS, ETCHING, DIFFUSION, AND
APPLICATION OF EVAPORATED LEADS AND CONTACTS.
CONSIDERABLE PROGRESS HAS BEEN MADE TOWARD
PERFECTING A WELDED PACKAGE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-291 876

PHOTOCIRCUITS CORP GLEN COVE N Y

MICROMINIATURE LAYERED PRINTED WIRING

(U)

SEP 62 1V MESSNER, G. ; MCCAW, R. ; PALUSZEK, M. ;
CONTRACT: DA-36-089-SC-90763

UNCLASSIFIED REPORT

DESCRIPTORS: •MANUFACTURING METHODS,
•MICROMINIATURIZATION (ELECTRONICS), •PRINTED CIRCUITS,
CHEMICAL MILLING, COPPER, GELS, LAMINATES, METAL FILMS,
PHOTOENGRAVING, PICTURES, PLATING, SANDWICH PANELS (U)

SPRAY ETCHING FOR PRODUCING THIN LINES, AND LAMINATING
TECHNIQUES FOR MULTILAYER PRINTED CIRCUITS IN A
MICROMINIATURIZATION PROGRAM.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-293 259

IIT RESEARCH INST CHICAGO ILL

FIBER-REINFORCED METALS AND ALLOYS

(U)

JAN 63 IUP PARIKH, N.M.:
REPT. NO. 8241 4
CONTRACT: N04-62-0650

UNCLASSIFIED REPORT

DESCRIPTORS: *COMPOSITE MATERIALS, *FIBERS, *METALS,
*REINFORCING MATERIALS, ALLOYS, ALUMINUM ALLOYS,
ATMOSPHERIC PRECIPITATION, BERYLLIUM ALLOYS, CARBIDES,
CHEMICAL MILLING, CHEMICAL PRECIPITATION, EXTRUSION,
GRAIN STRUCTURES (METALLURGY), HEAT TREATMENT, IRON
ALLOYS, MICROSTRUCTURE, POWDER METALLURGY, POWDER
METALS, PROCESSING, PRODUCTION, SILVER, SINTERING,
TUNGSTEN ALLOYS, WIRE

(U)

WORK WAS CONTINUED ON THE CHEMICAL ETCHING OF RAWN
BE WIRES TO REDUCE THEIR DIAMETERS FROM 0.0047 TO
ABOUT 0.001 INCH. SEVERAL MATRIX ALLOYS WERE
PREPARED BY ATOMIZING. THESE WERE PREPARED BY
FIRST MELTING 25 AL IN A CRUCIBLE, ADDING THE
ALLOYING ELEMENTS TO THE MELT, AND DISINTEGRATING THE
MOLTEN STREAM OF METAL OF ABOUT 100 PSI PRESSURE OF
DRY COMPRESSED AIR. THE POWDERS THUS COLLECTED
WERE SIEVED THROUGH A 60 MESH SCREEN AND COMPACTED IN
A 1-INCH DIE. IN THE WORK ON BE FIBER COMPOSITES,
THE SPREAD IN THE SIZE OF THE FIBERS WAS SO GREAT
THAT IT WAS DIFFICULT TO DESIGNATE AN AVERAGE SIZE.
THE FIBERS WERE MIXED WITH PLAIN 25 AL POWDER
(-60 MESH), COMPACTED IN A 1-INCH DIE AT 15 TSI
AND EXTRUDED AT TEMPERATURES BELOW 870F AT AN
EXTRUSION RATIO OF ABOUT 40:1. THE TENSILE
PROPERTIES AND ELASTIC MODULUS WERE MEASURED ON A
HOUNSFIELD TENSOMETER. IT WAS A CHIEF OBJECTIVE
OF THIS SERIES OF EXPERIMENTS TO SEE IF THESE
COMPOSITES COULD BE DENSIFIED BY EXTRUSION TECHNIQUE
, AND IT APPEARS THAT THIS TECHNIQUE IS SATISFACTORY.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-293 445

INNSBRUCK UNIV (AUSTRIA)

DISLOCATION MOBILITY IN ZINC SINGLE CRYSTALS (U)

DEC 62 1V ADAMS, K. H.; VREELAND, T. JR.;
CONTRACT: NONR22037

UNCLASSIFIED REPORT

DESCRIPTORS: *DEFORMATION, *SINGLE CRYSTALS, *ZINC, CHEMICAL MILLING, CONFIGURATION, CRYSTAL LATTICE DEFECTS, DENSITY, LOADING, METALLIC CRYSTALS, SHEAR STRESSES, STRESSES, TEST METHODS (U)

RESULTS OF A STUDY OF DISLOCATION MOBILITY IN HIGH PURITY ZINC SINGLE CRYSTALS ARE PRESENTED. DISLOCATION POSITIONS WERE DETERMINED USING A SPECIAL ETCHING TECHNIQUE, AND THE DISLOCATION DENSITY AND CONFIGURATION WERE DETERMINED BEFORE AND AFTER STATIC LOADING AND SHORT PULSE LOADING. LOADING AT STRESS LEVELS SLIGHTLY BELOW THE FLOW STRESS PRODUCE LOCAL DISLOCATION ARRANGEMENT, WITH THE MAXIMUM DISLOCATION DISPLACEMENT SOMEWHAT LESS THAN THE SUB-BOUNDARY SPACING. AT THE FLOW STRESS DISLOCATIONS PENETRATE THE SUB-BOUNDARIES AND RELATIVELY LARGE DISLOCATION DISPLACEMENTS ARE INDICATED (COMPARABLE TO THE SPECIMEN DIMENSIONS) IN STRESS PULSE TESTS OF APPROXIMATELY 30 SEC DURATION. SHORT DURATION STRESS PULSE LOADING AT A STRESS LEVEL APPROXIMATELY 70 TIMES THE FLOW STRESS PRODUCED A MAXIMUM DISLOCATION VELOCITY OF APPROXIMATELY 6 PER CENT OF THE SHEAR WAVE VELOCITY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-294 786

ARMY ELECTRONICS LABS FORT MONMOUTH N.J.

DESIGN CONSIDERATIONS FOR MICROWAVE GERMANIUM TUNNEL
DIODES

(U)

SEP 62 IV WANDINGER, L. IKLOHN, K. I
REPT. NO. TR2318

UNCLASSIFIED REPORT

DESCRIPTORS: •DIODES, •MANUFACTURING METHODS,
•SEMICONDUCTORS, CHEMICAL MILLING, ELECTROFORMING,
ENCAPSULATION, GERMANIUM, MEASUREMENT, MICROWAVE
EQUIPMENT, NEGATIVE RESISTANCE CIRCUITS, PRODUCTION,
RESISTANCE (ELECTRICAL), SURFACE PROPERTIES

(U)

A DISCUSSION IS PRESENTED ON THE TECHNOLOGY AND
PROBLEMS INVOLVED IN THE DESIGN CONSIDERATIONS,
FABRICATION, AND MEASUREMENT OF GERMANIUM TUNNEL
DIODES. FABRICATION INCLUDES MATERIAL PREPARATION,
METHODS OF CREATING ABRUPT P-N JUNCTIONS SUCH AS DOT
ALLYING, ELECTRICAL FORMING OR PULSE DISCHARGE
FORMING AND SOLUTION GROWTH, ETCHING PROCEDURES
NECESSARY TO OBTAIN LOW PEAK CURRENTS AND HIGH PEAK
TO VALLEY CURRENT RATIOS, AND PACKAGING
CONSIDERATIONS FOR LOW SERIES INDUCTANCE.
MEASUREMENT TECHNIQUES TO DETERMINE THE IMPORTANT
HIGH-FREQUENCY PARAMETERS, R_S , L_S , C , AND R_N , OF
THE DIODE ARE DISCUSSED. THE RESULTS OF
EXPERIMENTAL UNITS EXHIBITING CUTOFF FREQUENCIES UP
TO 5 GC ARE TABULATED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-295 057

SPRAGUE ELECTRIC CO NORTH ADAMS MASS

PRODUCTION ENGINEERING MEASURE RELIABILITY
IMPROVEMENT JET ETCH TRANSISTOR

(U)

OCT 62 IV GAGNE, R.M.; KRANTZ, J.E.; FOLSTER,
J.H.D.;

UNCLASSIFIED REPORT

DESCRIPTORS: •MANUFACTURING METHODS, CHEMICAL MILLING,
ELECTRICAL PROPERTIES, LIFE EXPECTANCY, PRODUCTION;
RELIABILITY; TRANSISTORS

(U)

THE OPTIMUM COLLECTOR RESISTIVITY, THE OPTIMUM
COLLECTOR THICKNESS, THE OPTIMUM ELECTRICAL
BASEWIDTH, AND THE PROPER EMITTER PLACEMENT WERE
DETERMINED. INVESTIGATIONS LEADING TO THESE
DETERMINATIONS ARE DESCRIBED. WORK HAS CONTINUED
TOWARD DEVISING A METHOD TO STOP AUTOMATICALLY THE
DELINEATION ETCHING PROCESS AFTER THE COLLECTOR
JUNCTION WAS DELINEATED. SOME PROGRESS WAS MADE IN
THIS AREA, AND WORK IS CONTINUING. TWO NEW PROCESS
STEPS WERE INTRODUCED AND DESCRIPTIONS OF THESE ARE
ALSO GIVEN. THE STATUS OF THE PROGRAM, LIFE TEST
RESULTS TO DATE, AND CURRENT FAILURE RATES ARE ALSO
PRESENTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-295 752

DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING (U)

JAN 63

IV

JAMIESON, J.L.; PARTRIDGE, E.G.

REPT. NO. TR7 648 V3

CONTRACT: AF33 600 43027

MONITOR: ASD TR7 648 V3

UNCLASSIFIED REPORT

DESCRIPTORS: *HONEYCOMB CORES, *STAINLESS STEEL, ACIDS, CARBOXYMETHYLCELLULOSE, CELLULOSE ACETATES, CHEMICAL MILLING, CHEMICALS, ELECTRIC CURRENTS, ELECTROCHEMISTRY, ELECTRODES, ELECTROLYTES, ELECTROLYTIC CELLS, GELS, METALS, POLARIZATION, POROUS MATERIALS, PROCESSING, REDUCTION, RESISTANCE (ELECTRICAL), SOLIDS, SOLUTIONS, THICKNESS (U)

ELECTROLYTIC ETCHING OF STAINLESS STEEL PLATES AND HONEYCOMB CORES; VARIOUS CHEMICAL COMPOUNDS USED FOR METAL SHAPING; PROCESSING OF AIRCRAFT MATERIALS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-295 707

TEXAS INSTRUMENTS, INC DALLAS

RESEARCH AND DEVELOPMENT OF HIGH TEMPERATURE
SEMICONDUCTOR DEVICES

(U)

DEC 61 17 WURST, E.C.; PETRITZ, R.L.;
CONTRACT: NOBSR85424

UNCLASSIFIED REPORT

DESCRIPTORS: ARSENIDES, CHEMICAL MILLING, DIFFUSION,
ENCAPSULATION, GALLIUM COMPOUNDS, GOLD ALLOYS,
MAGNESIUM, MANUFACTURING METHODS, OXIDES, SILICON
COMPOUNDS, TEMPERATURE, TESTS, TIN ALLOYS

(U)

GALLIUM ARSENIDE TRANSISTORS ARE FABRICATED AND
TESTED AT 150 C. SEVERAL TECHNIQUES ARE INVESTIGATED,
INCLUDING MAGNESIUM DIFFUSION IN GAAS AND THE
FEASIBILITY OF SiO₂ COATINGS ON GAAS AS A MASK AGAINST
IMPURITY DIFFUSION; POSTALLOY DIFFUSION AND CHEMICAL
POLISHING.

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AJ-400 732

PHOTOCIRCUITS CORP GLEN COVE N Y

MICROMINIATURE LAYERED PRINTED WIRING

(U)

DEC 62 IV MESSNER, G. MCCAW, R. PALUSZEK, M.
CONTRACT: DA-36-039-SC-90763

UNCLASSIFIED REPORT

DESCRIPTORS: CHEMICAL MILLING, CONFIGURATION, COPPER,
DRILLING MACHINES, ELECTRIC CONNECTORS, ELECTRIC
TERMINALS, EPOXY PLASTICS, GOLD, LAMINATED PLASTICS,
LAMINATES, MANUFACTURING METHODS, METAL COATINGS,
MICROMINIATURIZATION (ELECTRONICS), NICKEL, PANEL BOARDS
(ELECTRICITY), PLATING, PRINTED CIRCUITS, PRODUCTION,
SOLDERING (U)

PROCESS PARAMETERS FOR THE MANUFACTURE OF MICROMINIATURE
LAYERED PRINTED WIRING WITH PLATED-THROUGH HOLES AS
THE INTERCONNECTING LINK BETWEEN LAYERS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-402 164

GENERAL DYNAMICS/POHONA CALIF

EFFECT OF SURFACE FINISHES ON FATIGUE LIFE (U)

MAR 59

1V

WINSLOW, E. K. | LINDENEAU, G. D. | WISE,

W. E.;

REPT. NO. 8926 142

CONTRACT: AF33 657 8926

UNCLASSIFIED REPORT

DESCRIPTORS: ALLOYS, ALUMINUM ALLOYS, CHEMICAL MILLING,
COLD WORKING, DATA, EFFECTIVENESS, FATIGUE (MECHANICS),
HEAT TREATMENT, LIFE EXPECTANCY, MACHINING, STEEL,
STRESSES (U)

IDENTIFIERS: 4340 STEEL (U)

THE EFFECT OF SURFACE FINISHES PRODUCED BY CHEMICAL MILLING
AND MICRO-GLASS-PEENING ON THE FATIGUE LIFE
OF STEEL AND ALUMINUM ALLOYS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-404 185

GENERAL ELECTRIC CO SCHENECTADY N Y

SILICON PLANAR EPITAXIAL TRANSISTPE 2N2193.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 31 OCT 62-31
JAN 63.

JAN 63 .1V

CONTRACT: DA36 039SC66727

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, VAPOR PLATING, VACUUM
APPARATUS, SILICON, CHEMICAL MILLING, BONDING,
CLEANING, ALLOYS, BORON, PHOSPHORUS,
DIFFUSION, RELIABILITY (ELECTRONICS), MEASURE
MENT, MANUFACTURING METHODS.

(U)

IDENTIFIERS: PASSIVATION (SEMICONDUCTOR).

(U)

CONTENTS: IMPROVED KPR RESOLUTION CONTACT
EVAPORATION AND ALLOYING COLLECTOR ETCHING BORON
DIFFUSION PHOSPHORUS DIFFUSION COLLECTOR
CONTACT TO THE HEADER INTERCONNECTIONS
RELIABILITY MEASUREMENT INSPECTION AND QUALITY
CONTROL PLAN

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-404 537

RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON
PLANAR EPITAXIAL TRANSISTOR.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 NOV 62-31
JAN 63,

JAN 63 36P POSSEMATO, L.R.;

CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRAN
SISTORS, SILICON, CLEANING, EPITAXIAL GROWTH,
DIFFUSION, CHEMICAL MILLING, CONTAMINATION,
IMPURITIES, PHOSPHORUS, FIXED CONTACTS, GOLD,
MALFUNCTIONS; PROCESSING.

(U)

A TECHNIQUE OF ETCHING THE WAFERS WITH ANHYDROUS
HCL IN THE EPITAXIAL TUBE PRIOR TO EPITAXIAL
DEPOSITION WAS INCORPORATED INTO THE PROCESS. THE
OXIDE ON THE SURFACE OF THE WAFER SERVES AS A MASK
DURING THE DIFFUSION OPERATION AND GENERALLY SERVES
TO PROTECT THE SILICON SURFACES DURING WAFER
PROCESSING. IN PERFORMING THESE FUNCTIONS,
HOWEVER, IMPURITIES MAY BE DIFFUSED INTO THE OXIDE AT
THE HIGH DIFFUSION TEMPERATURES. A METHOD WAS
DEVELOPED PROVIDING THE CLEANEST POSSIBLE OXIDE TO
IMPROVE THE SURFACE PROTECTION ON THE FINISHED
PELLETS. EXPERIMENTS ARE ALSO BEING MADE ON BAKING
OF OXIDE TO DIFFUSE ENTRAPPED WATER MOLECULES TO THE
SURFACE FOR SUBSEQUENT EVAPORATION.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-405 861

WESTINGHOUSE ELECTRIC CORP YOUNGWOOD PA

MICROMINIATURE INTEGRATED CIRCUIT PACKAGE.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 OCT
62-1 JAN 63,

JAN 63 11P BARBARO, E.P.;

CONTRACT: DA36 039SC90850

PROJ: DA PROJ. 3A99 21 002 01

UNCLASSIFIED REPORT

DESCRIPTORS: *MICROMINIATURIZATION (ELEC
TRONICS), *INTEGRATED CIRCUITS, *PACKAGED
CIRCUITS, *MODULES (ELECTRONICS), PROCESSING,
SEALS (STOPPERS), GRAPHITE, GLASS, CHEMICAL
MILLING, CLEANING, MECHANICAL PROPERTIES.

(U)

TWO SUCCESSIVE DESIGN MODIFICATIONS WERE MADE TO
THE GRAPHITE GLASSING BOATS IN ORDER TO ACHIEVE MORE
UNIFORM PACKAGE APPEARANCE. FIFTY PACKAGE SAMPLES
WERE SUBMITTED FOR MECHANICAL EVALUATION.
TECHNIQUES FOR SEALING THE INTEGRATED CIRCUIT
PACKAGE WERE ESTABLISHED. IMPROVED CLEANING
TECHNIQUES WERE ESTABLISHED FOR DEOXIDIZING KOVAR
PARTS PRIOR TO GOLD PLATING RESULTING IN LESS PITTING
OF THE METAL. STAMPED LEAD PRE FORMS RECEIVED
DURING THIS PERIOD. THE FIRST ONE HUNDRED
MICROMINIATURE CIRCUIT PACKAGES SUBMITTED WERE
FABRICATED WITH ETCHED LEADS. THE STAMPED LEADS ARE
MORE UNIFORM IN CROSS SECTION. CERAMIC MICROMODULES
WITH PAUS WERE DESIGNED AND ORDERED. THIS
MICROMODULE WILL BE UTILIZED TO DEVELOP AN INTEGRAL
PACKAGE USING THE CERAMIC MICROMODULE AS A BASE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-408 19U

ARMY ELECTRONICS LABS FORT MONMOUTH N J

TECHNOLOGY FOR PNP PLANAR SILICON TRANSISTORS:
SWITCHING AND AMPLIFYING.

(U)

MAR 63 21P LAROCQUE, ARMOND P.; YATSKO,
ROBERT S.; ROGEL, ALEX.; JACKSON, RAYMOND I.; RIBLE,
VINCENT E.;

REPT. NO. TR-2339

PROJ: DA-3-A-992100302

UNCLASSIFIED REPORT

DESCRIPTORS: (TRANSISTORS, MANUFACTURING
METHODS), DIFFUSION, IMPURITIES, ANTIMONY,
BONDING, GAIN, CRYSTAL GROWTH, SILICON,
CHEMICAL MILLING, POLISHES, PHOTOENGRAVING,
BORON, METAL FILMS, TESTS, CAPACITORS,
RESISTORS, ULTRAHIGH FREQUENCY, GOLD, MICRO
MINIATURIZATION (ELECTRONICS).

(U)

IDENTIFIERS: 1963, PLANAR TRANSISTORS.

(U)

PROCESSES AND TECHNIQUES REQUIRED FOR FABRICATION
OF EXPERIMENTAL PLANAR PNP SILICON TRANSISTORS WERE
DEVELOPED AND DEMONSTRATED AS FEASIBLE. PROCESSES
INVOLVED INCLUDE MATERIAL PREPARATION, ANTIMONY BASE
DIFFUSION, BORON EMITTER DIFFUSION, OXIDE MASKING,
PHOTORESIST TECHNIQUES, SIMULTANEOUS GOLD METALIZING
OF EMITTER AND BASE REGIONS, COLLECTOR ALLOY CONTACT
AND BIASING, AND THERMAL COMPRESSION BONDING. INITIAL
TRANSISTORS HAVE TYPICAL DC BETA VALUES OF 35 TO 40
AND FT VALUES AS HIGH AS 350 MCS. PROCESSES
DESCRIBED WERE ALSO USED IN PRELIMINARY FABRICATION
OF SOLID STATE MICROCIRCUIT PASSIVE COMPONENTS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-412 841

LEAR SIEGLER INC SANTA MONICA CALIF

SEMICONDUCTOR THIN FILMS.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 APR-30 JUNE 63.

63 18P

CONTRACT: AF33 657 7623

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS), MANUFACTURING METHODS, VAPOR PLATING, VACUUM, GALLIUM COMPOUNDS, ARSENIDES, HALL EFFECT, MEASUREMENT, ELECTRON MICROSCOPY, CHEMICAL MILLING, X-RAY DIFFRACTION ANALYSIS.

IDENTIFIERS: THIN FILMS

(U)

(U)

(1) TO DEPOSIT FILMS IN A DYNAMIC 10 TO THE -8TH POWER VACUUM SYSTEM; (2) TO INVESTIGATE ANNEALING OF GAAS FILMS; (3) TO MAKE HALL MEASUREMENTS AT A SERIES OF TEMPERATURES; (4) TO INVESTIGATE DEPOSITION AT MICRONS PER SECOND; (5) TO IMPROVE THE RESOLUTION IN ELECTRON MICROSCOPE SURFACE STUDIES AND TO INVESTIGATE A SETUP FOR ETCHING THICKER FILMS DOWN TO THICKNESSES SUITABLE FOR ELECTRON MICROSCOPY; AND (6) TO CONTINUE DEVICE STUDIES WITH FILMS OF AVAILABLE QUALITY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-414 913

RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708
SILICON PLANAR EPITOXIAL TRANSISTOR.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 FEB-30 APR
63,

APR 63 87P WARREN, A. I POSSEMATO, L. R. I

CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING
METHODS), (*MANUFACTURING METHODS, TRANSIS
TORS), CLEANING, EPITOXIAL GROWTH, SEMICONDUCTOR
DEVICES, CHEMICAL MILLING, FIXED CONTACTS,
GOLD, ALUMINUM, CONTAMINATION, BONDING,
QUALITY CONTROL, RELIABILITY, PROCESSING,
SURFACES.

(U)

IDENTIFIERS: 1963.

(U)

PROCESS IMPROVEMENTS WERE COMPLETED IN ALL AREAS
INVESTIGATED. AN IMPROVED METHOD OF REMOVING
PHOTORESIST WAS DEVELOPED. A STUDY OF INORGANIC
REAGENT MATERIALS AS SOURCES OF SEMI-CONDUCTOR
SURFACE CONTAMINATION WAS COMPLETED. CONCLUSIONS
CONCERNING THE CONCENTRATIONS OF IMPURITIES AND THE
EFFECTIVENESS OF VARIOUS DESORPTION TECHNIQUES ARE
INCLUDED. THE USE OF THIN ALUMINUM CONTACTS HAS
INHIBITED FORMATION OF "PURPLE PLAGUE".
EXPERIMENTS WITH GOLD CONTACTS WERE UNSUCCESSFUL.
THE USE OF GOLD ALLOY WIRE DID NOT MATERIALLY
IMPROVE THE BOND STRENGTH. NAILHEAD BONDING WITH
A SMALLER DIAMETER GOLD WIRE TO REDUCE THE SIZE OF
THE BALL MET WITH ONLY LIMITED SUCCESS. A PROGRAM
OF RELIABILITY TESTING AND ANALYSIS AND STUDIES OF
THERMAL RESISTANCE MEASUREMENTS FROM JUNCTION TO
AMBIENT (T SUB J-A) WERE COMPLETED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-418 226

KELSEY-HAYES CO ROMULUS MICH

THE DESIGN AND EVALUATION OF PERFORATED ION
EMITTERS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. MAY 62-AUG 63,
SEP 63 IV PETRICK, E.N.; KRAUSS, J.J.;
CONTRACT: AF33 657 8638
PROJ: AF-3141
TASK: 3141U2
MONITOR: ASD TOR63 750

UNCLASSIFIED REPORT

DESCRIPTORS: (*ION ENGINES, ION SOURCES), (*ION
SOURCES, CESIUM), (*CESIUM, IONIZATION),
ELECTRIC PROPULSION, MANUFACTURING METHODS,
ELECTRON BEAMS, CHEMICAL MILLING, SHEETS,
RELIABILITY, FEASIBILITY STUDIES, POROUS
METALS, GAS FLOW, NITROGEN, TUNGSTEN, MOLY
BDENUM.

(U)

IDENTIFIERS: 1963.

(U)

THE FEASIBILITY OF UTILIZING EMITTERS OF PERFORATED SOLID SHEET RATHER THAN A SINTERED POWDER STRUCTURE WAS INVESTIGATED WITH THE OBJECTIVE OF INCREASING THE RELIABILITY AND DURABILITY OF ION ENGINES. VARIOUS TECHNIQUES FOR DRILLING MICRON-SIZE HOLES IN REFRACTORY METALS WERE EXPLORED. TWO OF THESE PROCESSES, ELECTRON BEAM DRILLING AND CHEMICAL PHOTO-ETCHING, WERE USED TO PROVIDE TEST EMITTERS WITH HOLE SIZES IN THE 10-MICRON RANGE. AN ELECTRON BEAM DRILLED EMITTER WAS CS FLOW TESTED FOR 83 HOURS AND EXHIBITED, WITHIN EXPERIMENTAL LIMITS, NO DISCERNIBLE CHANGE IN HOLE SIZE OR FLOW CONDUCTANCE. IN SEPARATE TESTS CORRELATION WAS MADE OF THEORETICAL AND MEASURED FLOW RATES OF N AND CS THROUGH THE EMITTERS. IT WAS DETERMINED THAT THE MEASURED CS FLOW RATE EXCEEDED THE THEORETICALLY CALCULABLE VALUE BASED ON AVAILABLE SURFACE DIFFUSION FORMULAE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-418 684

GENERAL ELECTRIC CO SYRACUSE N Y

MATRIX CONTROLLED DISPLAY DEVICE.

(U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. NO. 1, 1
JULY 16 SEP 63.

AUG 63 30P

CONTRACT: NOBSR89334

PROJ: SR080301

TASK: 9475

UNCLASSIFIED REPORT

DESCRIPTORS: (•DISPLAY SYSTEMS, ELECTRONIC
RECORDING SYSTEMS), (•ELECTRONIC RECORDING SYSTEMS,
GEOMETRIC FORMS), FEASIBILITY STUDIES, VIEWING
SCREENS, BRIGHTNESS, THERMOPLASTICS,
DEFORMATION, CIRCUITS, PHOTOENGRAVING, OPTICS,
CHEMICAL MILLING, ELECTRODES, TEST
EQUIPMENT.

(U)

IDENTIFIERS: 1963. MATRIX CONTROLLED DISPLAY.

(U)

A DESCRIPTION IS PRESENTED OF THE WORK ACCOM-
PLISHED TO DEVELOP A FEASIBILITY MODEL OF A MATRIX
CONTROLLED DISPLAY DEVICE USING TECHNIQUES CALLED IN-
AIR SURFACE DEFORMATION RECORDING AND TIRP (TOTAL
INTERNAL REFLECTION PRISROJECTION. TO
INTRODUCE THE READER TO THESE TECHNIQUES, A BRIEF
DESCRIPTION OF THEIR BASIC PRINCIPLES IS GIVEN.
THE TEST SETUP TO PROVIDE AN ELEMENTAL PORTION OF
THE LARGE SCREEN DISPLAY AT 20 TO 30 FOOT-LAMBERTS
BRIGHTNESS BY OPTICAL READOUT OF DEFORMATIONS ON A
THERMOPLASTIC OR OIL MEDIUM IS DISCUSSED.
CIRCUITRY TO IMPLEMENT THE DEFORMATION RECORDING
TECHNIQUE USING X-Y MATRIX CONTROL IS GIVEN. A
BASIC MECHANICAL CONFIGURATION IS CONSIDERED.
INFORMATION IS PROVIDED ON THE PREPARATION OF
ARTWORK AND A PHOTOGRAPHIC MASK NECESSARY TO
FABRICATE MATRIX ELECTRODES AT 5, 10, AND 20 LINE
PAIRS PER MILLIMETER WITH THREE ELECTRODE WIDTHS.
THE RESULTS OF INITIAL EXPERIMENTS IN ETCHING OF
TRANSPARENT, CONDUCTIVE COATINGS TO FORM THE
ELECTRODES ARE GIVEN. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-419 585

SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS

PRODUCTION ENGINEERING MEASURE FOR GALLIUM
ARSENIDE VARACTOR DIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 MAR-
31 MAY 63,

MAY 63 IV DAVIS, C.F.; FELDMAN, E.J.;
CONTRACT: DA36 D39SC86736

UNCLASSIFIED REPORT

DESCRIPTORS: (VARACTOR DIODES, PRODUCTION),
(MANUFACTURING METHODS, VARACTOR DIODES),
GALLIUM ALLOYS, ARSENIC ALLOYS, EPITAXIAL
GROWTH, FIXED CONTACTS, CONTAINERS, CAPACI
TANCE, ELECTRIC POTENTIAL, CHEMICAL MILLING,
DIFFUSING, IMPURITIES, ZINC, TELLURIUM,
ARSENIC, PHOTOENGRAVING. (U)

IDENTIFIERS: 1963, MESA (SEMICONDUCTOR). (U)

STUDIES TO OBTAIN THE PROCESSES NECESSARY FOR THE
HIGH VOLUME PRODUCTION OF GALLIUM ARSENIDE VARACTOR
DIODES ARE DESCRIBED IN THIS REPORT. THESE
INVESTIGATIONS INCLUDE STUDIES OF MESA CONTACTS,
EPITAXIAL MATERIAL, PACKAGING, OHMIC CONTACTS AND
ETCHING PROCEDURES. THE RESULTS OF THE FABRICATION
OF COMPLETELY EPITAXIAL DIODES AND DIFFUSED
EPITAXIAL DIODES ARE DISCUSSED AS WELL AS
CONTROLABLE ETCHING PROCEDURES FOR VOLUME PRODUCTION.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-420 375

WESTINGHOUSE ELECTRIC CORP DAYTON OHIO

500 C SILICON CARBIDE RECTIFIER PROGRAM.

(U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL PROGRESS REPT. NO. 8.

1 JULY30 SEP 63.

OCT 63

20P

CHANG, H. C. ; JENNINGS, V. J.

THORNBURG, D. R. ; KROKO, L. J. ; OSTROSKI, J. ;

CONTRACT: AF33 657 7027

PROJ: 7 727

MONITOR: ASD IR7 727, VOL. 8

UNCLASSIFIED REPORT

DESCRIPTORS: (*CRYSTAL RECTIFIERS, SILICON ALLOYS),
(*SILICON ALLOYS, CRYSTAL RECTIFIERS), (*DIODES
(SEMICONDUCTORS), SILICON ALLOYS), POWER EQUIPMENT
PARTS, CARBON ALLOYS, HIGHTEMPERATURE RESEARCH,
EPITAXIAL GROWTH, IMPURITIES, CHEMICAL MILLING, BORATES,
SODIUM COMPOUNDS, LIFE EXPECTANCY, STORAGE, SURFACE
PROPERTIES, MANUFACTURING METHODS, TESTS

(U)

IDENTIFIERS: 1963

(U)

EFFORTS WERE CONTINUED ON THE DEVELOPMENT OF 500
DEGREE C SILICON CARBIDE RECTIFIERS. THE GROWTH
RATE OF SILICON CARBIDE CRYSTALS PREPARED BY THE
SUBLIMATION METHOD WAS DETERMINED BY MEASURING THE
AMOUNT OF GROWTH BETWEEN SUCCESSIVE, TIMED DOPANT
ADDITIONS. THIS WAS COMPARED WITH THE GROWTH RATE
AS OBTAINED FROM A SIMPLE MODEL. ALL VALUES AGREE
WITHIN A FACTOR OF FIVE. THE USE OF MOLTEN BORAX
AS AN ETCHANT FOR SILICON CARBIDE WAS STUDIED. DUE
TO ITS RELATIVELY SLOW ETCH RATE (ABOUT 30 TIMES
SLOWER THAN A MOLTEN SODIUM PEROXIDE-SODIUM HYDROXIDE
MIXTURE) A MUCH FINER CONTROL OF THE ETCHING IS
POSSIBLE. DETAILS ARE GIVEN ON THE LIFE AND
STORAGE TESTS WHICH WERE SUCCESSFULLY PASSED BY TWO
SILICON CARBIDE RECTIFIERS. AN OPEN TUBE-FLOWING
GAS SYSTEM WAS SHOWN SUITABLE FOR THE SURFACE
PASSIVATION OF GROUPS OF SILICON CARBIDE RECTIFIERS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-422 492

BELL TELEPHONE LABS INC WHIPPANY N J

ENGINEERING SERVICES ON TRANSISTORS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 APR-
30 JUNE 63,

SEP 63 1V ARNOLD, S. R. ; DAVIS, R. E. ;

GIBBONS, G. ; KOCIS, J. ; MARTERSTECK, K. E. ;

REPT. NO. 12

CONTRACT: DA36 039AMC0227

PROJ: 3A99 21 001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTINUATION OF CONTRACT DA36
039SC9U759.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*INTEGRATED CIRCUITS, TRANSISTORS), GERMANIUM, SILICON,
ELECTRIC POTENTIAL, SUPERHIGH FREQUENCY, CHEMICAL
MILLING, ELECTRIC CURRENTS, EPITAXIAL GROWTH, ELECTRICAL
CONDUCTANCE, RESISTORS, AGING (MATERIALS), DIODES
(SEMICONDUCTOR), CIRCUITS, ELECTRONIC SWITCHES,
ULTRAHIGH FREQUENCY, TEMPERATURE, BONDING, OXIDES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS
ELECTRONICS (U)

RESEARCH CONCERNS STUDIES AND INVESTIGATIONS
RELATED TO TRANSISTORS AND TRANSISTOR-LIKE DEVICES,
WITH A VIEW TOWARD DEMONSTRATING AND INCREASING THE
PRACTICABILITY OF THEIR USE IN OPERATING EQUIPMENT.
WORK IS DISCUSSED ON A 6-GC GERMANIUM TRANSISTOR
AND INTEGRATED CIRCUIT DEVICES. A COMPARISON IS
MADE OF ELECTRICAL BREAKDOWN CHARACTERISTICS OF
GERMANIUM DIODES MADE BY PLANAR TECHNIQUES AND BY
MESA ETCHING. IT IS SHOWN THAT FOR THE PLANAR TYPE
THE REVERSE CURRENT VOLTAGE CHARACTERISTIC WILL BE
SOFTER THAN THAT OF A MESA DIODE FROM THE SAME
MATERIAL AND THE BREAKDOWN VOLTAGE WILL BE LOWER.
BREAKDOWN VOLTAGE IS CALCULATED FOR EPITAXIAL
GERMANIUM AND SILICON STRUCTURES. IT IS SHOWN THAT
WHEN THE CONDUCTIVITY OF THE SUBSTRATE AND THE
DIFFUSED LAYER ARE BOTH MUCH GREATER THAN THAT OF THE
EPITAXIAL LAYER, THEN FOR THIN LAYERS THE BREAKDOWN
VOLTAGE DEPENDS ONLY ON THE THICKNESS BETWEEN THE
DIFFUSED JUNCTION AND THE SUBSTRATE. FABRICATION
TECHNIQUES AND PROBLEMS RELATED TO THE 6-GC
TRANSISTOR ARE DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-422 940

RAYTHEON CO LEWISTON MAINE

PRODUCTION ENGINEERING MEASURE ON SILICON ALLOY
TRANSISTORS.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 JAN-31 MAR
63,

MAR 63 28P JONES, R. W. ;

CONTRACT: DA36 039SC06744

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, PRODUCTION), (*MANUFACTURING
METHODS, TRANSISTORS), RESISTANCE (ELECTRICAL), SILICON,
RELIABILITY (ELECTRONICS), TIN, ALLOYS, FIXED CONTACTS,
SOLDERING, CHEMICAL MILLING, FAILURE (MECHANICS),
QUALITY CONTROL, CRYSTAL LATTICE DEFECTS, SOLDERING
FLUXES

(U)

IDENTIFIERS: 1963; JET ETCHING, VIBRATORY ETCHING,
PASSIVATION (SEMICONDUCTOR)

(U)

EFFORTS CONTINUED ON THE IMPROVEMENT OF PRODUCTION
TECHNIQUES TO INCREASE THE RELIABILITY OF SILICON
TRANSISTORS. FURTHER CONTROL OF CHIP DIMENSIONS WAS
ACHIEVED. THE BULK MATERIAL PARAMETERS OF
RESISTIVITY AND DISLOCATION DENSITY WERE STUDIED.
METALLOGRAPHIC ANALYSIS OF ALLOYING LED TO FIRING
JIG REDESIGN. THE EFFECTS OF TIN, DISLOCATION
DENSITY, AND CHIP THICKNESS ON ALLOYING WERE
DETERMINED. AN IMPROVED EMITTER WHISKER WAS
INTRODUCED. HIGH TEMPERATURE SOLDER WAS INTRODUCED
WITH PARTIAL FLUX ELIMINATION. A NEW APPROACH TO
MORE EFFICIENT ETCHING WAS EXPLORED. STEP-STRESS
EQUIPMENT IS UNDER CONSTRUCTION. FORMAL FAILURE
MODE ANALYSIS IS INITIATED. OPERATION STANDARDS,
DRAWINGS, AND QUALITY INSPECTION PROCEDURES WERE
ISSUED AND WORK ON THE INSPECTION AND QUALITY CONTROL
PLAN WAS INITIATED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /ZDHL6

AD-423 325

GENERAL ELECTRIC CO IRMO S C

SOLID ELECTROLYTE TANTALUM FOIL CAPACITOR.

(U)

DESCRIPTIVE NOTE: QUARTERLY RESEARCH AND DEVELOPMENT REPT,

1 JULY27 SEP 63,

SEP 63 27P JENNY, A. L. ;

CONTRACT: N06SR89386

PROJ: SR0080303

TASK: 9636

UNCLASSIFIED REPORT

DESCRIPTORS: (TANTALUM CAPACITORS, FOILS),
ELECTROLYTES, SOLIDS, PHOSPHORIC ACIDS, CLEANING,
MANGANESE COMPOUNDS, OXIDES, SEMICONDUCTORS,
ELECTRODEPOSITION, AGING (MATERIALS), CATHODES, CHEMICAL
MILLING (U)
IDENTIFIERS: 1963, ETCHING (U)

EXPERIMENTAL WORK HAS SHOWN THAT UNDER CERTAIN
CONDITIONS PERMANENT DAMAGE TO THE ANODIC OXIDE CAN
BE MADE DURING THE PROCESS OF DEPOSITING THE
MANGANESE OXIDE. FROM THE VIEWPOINT OF THE SOLID
FOIL TANTALUM CAPACITOR, THE RESULTS SUGGEST THAT A
MINIMUM NUMBER OF DEPOSITION CYCLES MUST BE USED WITH
CAREFUL CONTROL OF THE SOLUTION CONCENTRATION. THE
BREAKDOWN VOLTAGE TESTS CONFIRM THAT THE TYPE OF
TANTALUM FOIL, IN PARTICULAR, THE SURFACE CONDITION,
HAS A CONTROLLING EFFECT ON SUBSEQUENT HIGH VOLTAGE
PERFORMANCE. THE FORMATION CONDITIONS, FORMATION
VOLTAGE, NUMBER OF COATS OF MANGANESE DIOXIDE, AREA
OF DEPOSIT AND TIME AT DECOMPOSITION TEMPERATURE ARE
ALSO VERY IMPORTANT IN CONTROLLING THE BREAKDOWN
VOLTAGE. FOR THE 250 VOLT SOLID FOIL CAPACITOR
APPLICATION, IT IS SOMEWHAT DISTURBING TO NOTE THAT
THE BEHAVIOR OF THE TAZO5/MNOX INTERFACE
APPEARS TO CHANGE FOR THICKNESS GREATER THAN THE
EQUIVALENT OF 200 VOLTS FORMATION. MORE WORK IS
NECESSARY TO DETERMINE WHETHER THE POORER PERFORMANCE
AT THE HIGHER VOLTAGES IS DUE TO SOME BASIC PHYSICAL
PHENOMENA OR DUE TO UNSUITABLE TANTALUM FOIL AND
PROCESSING CONDITIONS WHICH ARE NOT THE OPTIMUM.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-423 367

NAVAL ORDNANCE LAB WHITE OAK MD

POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE,
LEAD SELENIDE, AND LEAD TELLURIDE, (U)

MAY 63 27P NORR, MARRINER K. I
REPT. NO. NOLTR-63-156

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, CRYSTALS),
(*ELECTROLYTIC POLISHING, CRYSTALS), (*CRYSTALS,
PRECISION FINISHING), SELENIDES, SULFIDES, TELLURIDES,
LEAD COMPOUNDS, TIN COMPOUNDS, ETCHED CRYSTALS,
CASTINGS, CRYSTAL LATTICE DEFECTS, SOLUTIONS, REVIEWS,
SELENIUM ALLOYS, TELLURIUM ALLOYS, LEAD ALLOYS, TIN
ALLOYS (U)
IDENTIFIERS: 1963, ETCHES, POLISHES (U)

A REVIEW IS GIVEN OF CHEMICAL AND ELECTROLYTIC
POLISHES AND DISLOCATION ETCHES FOR SNTE,
PBS, PBSE, AND PBTE, COVERING THE PERIOD
FROM 1907 TO 1962. RECIPES, CONDITIONS, AND RESULTS
ARE DESCRIBED. SATISFACTORY POLISHES FOR ALL
COMPOUNDS EXCEPT PBS AND ETCHES FOR ALL EXCEPT
SNTE ARE INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-423 388

GENERAL DYNAMICS/FORT WORTH TEX

DEVELOPMENT OF CHEMICAL MILLED WAFFLE GRID BERYLLIUM
STRUCTURAL PANEL, (U)

NOV 63 31P ROGERS, C. W. ; FEHRLE, A. C. ;
LOVE, T. S. ;
REPT. NO. ERR FW135
CONTRACT: AF33 657 11214

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, METAL PLATES), (*METAL PLATES,
CHEMICAL MILLING), MATERIAL REMOVAL, TENSILE PROPERTIES,
STRESSES, STRAIN (MECHANICS), COMPRESSIVE PROPERTIES,
STRUCTURAL PROPERTIES, ELASTICITY, SHEAR STRESSES,
STRUCTURAL PARTS, AEROSPACE CRAFT (U)
IDENTIFIERS: 1963 (U)

THIS REPORT CONCERNS THE RESEARCH AND DEVELOPMENT
OF AN AEROSPACE STRUCTURAL PANEL MADE FROM QMV
BERYLLIUM HOT-ROLLED PLATE. THE PROGRAM WAS A
JOINT EFFORT OF THREE COMPANIES. THE BRUSH
BERYLLIUM COMPANY MANUFACTURED THE BERYLLIUM
PLATE. THE UNITED STATES CHEMICAL MILLING
CORPORATION MILLED THE INTEGRALLY STIFFENED
STRUCTURAL PANEL TO THE DESIGN SPECIFICATION
ESTABLISHED BY THE GENERAL DYNAMICS
CORPORATION/FORT WORTH. GENERAL DYNAMICS
CORPORATION/FORT WORTH CONDUCTED THE FINAL
STRUCTURAL TESTS ON THE FINISHED PANEL. RESULTS OF
THIS PROGRAM CONFIRM THE ABILITY OF TODAY'S TECHNOLOGY
TO PRODUCE A SATISFACTORY STRUCTURAL PANEL MADE FROM
BERYLLIUM. THE MOST CRITICAL PROBLEM ENCOUNTERED
WAS THE VARIATION OF APPARENT MODULUS OF ELASTICITY.
STATIC STRENGTH WAS FOUND TO VARY EXCESSIVELY WITH
SURFACE FINISH. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-425 102

MCDONNELL AIRCRAFT CORP ST LOUIS MO

CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN
ALUMINUM AND STAINLESS STEEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

DEC 63

22P

WEEKS, ROBERT F. ; MALAKELIS,

ELIAS ;

REPT. NO. A239

CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*STAINLESS STEEL, CHEMICAL MILLING),
(*ALUMINUM, CHEMICAL MILLING), (*CHEMICAL MILLING,
FLUIDS), PANELS (STRUCTURAL), MATERIAL REMOVAL,
VARNISHES, PHOTSENSITIVITY, METALLOGRAPHY, SOLUTIONS,
PHOTOMICROGRAPHY (U)
IDENTIFIERS: 7176-T6 ALUMINUM, 321 STAINLESS STEEL.
ETCHANTS, MASKANTS, 1963 (U)

FIVE TYPES OF MASKANTS AND THREE ETCHANT SOLUTIONS
WERE EVALUATED FOR THE PURPOSE OF PRODUCING PRECISION
SLOTS IN STAINLESS STEEL AND ALUMINUM. THE SCREEN
PRINTING MASKANTS TESTED WERE NELCO SILK SCREEN
STOP-OFF LACQUER R-5018 AND MEAKER STOP-
OFF LACQUER. THE PHOTSENSITIVE MASKANTS TESTED
WERE KODAK PHOTO RESIST, KODAK METAL ETCH
RESIST, AND KODAK PHOTO LACQUER.
COMBINATIONS OF THE DIFFERENT PHOTSENSITIVE
MASKANTS WERE ALSO TESTED. THE 321 STAINLESS STEEL
PANELS WERE MILLED WITH STEEL CHEM-MILL ETCHANTS PER
PS 20022.2 AND THE 7178-T6 ALUMINUM PANELS WERE
MILLED WITH EITHER HCL SOLUTION OR AN ALKALINE
ETCHANT SOLUTION PER PS 20023. THE HYDROGEN ION
NORMALITY WAS KEPT WITHIN A SPECIFIED NORMALITY RANGE
DURING THE STEEL CHEM-MILLING. THE CUTTING RATE OF
THE ETCHANT SOLUTION VARIED DEPENDING ON THE
HYDROGEN ION CONCENTRATION, THE SPRAYING CONDITIONS,
AND THE MASKANT CONFIGURATION. THE ONLY SUITABLE
MASKANT TESTED ON STEEL WAS KODAK PHOTO RESIST
OVER KODAK METAL ETCH RESIST. THE MEAKER
AND NELCO MASKANTS WERE TESTED FOR CHEM-MILLING
ALUMINUM. BOTH MASKANTS WERE SUITABLE FOR MILLING
THE LARGER SLOT WIDTHS. THE CUTTING RATE VARIED
DEPENDING ON ETCHANT SOLUTION AND MASKANT
CONFIGURATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-426 356

CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION
TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600
SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JULY-30 SEP
63,

SEP 63 41P WILLIAMS, JOHN R. I
CONTRACT: DA36 039AMC01483E

UNCLASSIFIED REPORT

DESCRIPTORS: (•TRANSISTORS, PRODUCTION), SILICON,
DIFFUSION, POSITIONING DEVICES (MACHINERY), BONDING,
ULTRASONIC RADIATION, CHEMICAL MILLING, OXIDATION,
BORON, RELIABILITY (ELECTRONICS) (U)
IDENTIFIERS: 163, FIELD EFFECT TRANSISTORS (U)

IMPROVEMENTS WERE MADE IN THE DIFFUSION EQUIPMENT
AND TECHNIQUE. HULK-DIFFUSION WAS STUDIED AND
GRAPHS PRESENTED OF DIFFUSION DISTANCE VERSUS TIME.
STUDIES WERE ALSO MADE OF THE DIODE
CHARACTERISTICS AS A FUNCTION OF DIFFUSION CONDITION.
ULTRASONIC BONDING - AN ULTRASONIC BONDER WAS
PURCHASED AND INSTALLED. PRELIMINARY EVALUATION OF
USB DEVICES WERE MADE. MASKS AND ALIGNMENT
SYSTEMS - A NEW MASK ALIGNMENT SYSTEM WAS
PURCHASED AND INSTALLED. MASKS WERE ORDERED FOR
INTERNAL SHORTING OF THE DEVICE. ETCHING FIXTURE
- SEVERAL PROTOTYPE DESIGNS WERE FABRICATED AND
EVALUATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#426 932

ARMY MISSILE COMMAND REDSTONE ARSENAL ALA ARMY INERTIAL
GUIDANCE AND CONTROL LAB AND CENTER

MISSILE-BORNE TRACKING ANTENNA.

(U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT. FOR 1963,

JUL 63 52P HOWELL, JAMES E.;

REPT. NO. RG-TR-63-20

UNCLASSIFIED REPORT

DESCRIPTORS: (•GUIDED MISSILE ANTENNAS, ELEC
TROMIC SCANNERS), PHASE MEASUREMENT, POLARIZA
TION, AUTOMATIC, TRACKING, ANTENNA FEEDS,
IMPEDANCE MATCHING, COAXIAL CABLES, ANTENNA
CONFIGURATIONS, ANTENNA LOBES, SUPERHIGH FRE
QUENCY, HELICAL ANTENNAS, SPIRAL ANTENNAS,
PRINTED CIRCUITS, CHEMICAL MILLING, CAVITY
RESONATORS, GRAIN, PHASE SHIFTERS, ANTENNA
RADIATION PATTERNS.

(U)

IDENTIFIERS: 1963, LOGARITHMIC SPIRAL ANTENNA,
BALUN.

(U)

THE DEVELOPMENT OF ELECTRONICALLY STEERABLE,
AUTOMATICALLY SELF-DIRECTING, MISSILE-BORNE ANTENNAS
IS DESCRIBED. THE LITERATURE WAS SEARCHED AND A
PRELIMINARY STUDY WAS MADE ON THE USE OF CIRCULARLY
POLARIZED ANTENNAS FOR PRODUCING THE NECESSARY PHASE
SHIFTS REQUIRED IN THE LOBING OF ANTENNA ARRAYS.
HELICAL ANTENNAS WERE USED FIRST IN TESTS AROUND 5,
000 MC IN AN EFFORT TO DETERMINE THE PHASING
CHARACTERISTICS AND FEASIBILITY OF CIRCULARLY
POLARIZED ANTENNAS. NEXT, A CAVITY-BACKED
ARCHIMEDEAN SPIRAL ANTENNA AND BALUN WERE DESIGNED
AND FABRICATED FOR 5,000 MC OPERATION. A
LOGARITHMIC SPIRAL ANTENNA WAS ALSO DESIGNED AND
FABRICATED FOR USE IN THE DEVELOPMENTAL ANTENNA
TESTS. THE SPIRAL ANTENNAS WERE FABRICATED FROM
COPPER CLAD BOARD BY PRINTED CIRCUIT ETCHING
TECHNIQUES. SOME OF THE PROBLEMS ENCOUNTERED
DURING LABORATORY TESTS WERE BALUN UNBALANCE,
RADIATION FROM THE BALUN AND THE DETRIMENTAL EFFECTS
OF THE REFLECTED WAVE WHEN USING CAVITIES.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD431 602

MCDONNELL AIRCRAFT CORP ST LOUIS MO

ELECTROCHEMICAL DEBURRING OF MOLYBDENUM, ALUMINUM AND
STAINLESS STEEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

MAR 64 54P WOLFF, JAMES E. I

REPT. NO. A478

CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*METALS, MATERIAL REMOVAL), (*MATERIAL
REMOVAL, ELECTROCHEMISTRY), CHEMICAL MILLING,
ELECTROLYTIC POLISHING, MOLYBDENUM, ALUMINUM ALLOYS,
STAINLESS STEEL, SOLUTIONS, ALCOHOLS, CHROMIC ACIDS,
NITRIC ACID, SULFURIC ACID, FLUORINE COMPOUNDS, ACIDS(U)

SHARP EDGES LEFT AFTER CHEMICAL MILLING AND
BLANKING ARE PRESENTLY BEING MECHANICALLY REMOVED AT
HIGH COST. THE SHARP EDGES WOULD BE AREAS OF HIGH
CURRENT DENSITY IN ELECTROCHEMICAL OPERATIONS AND
COULD BE EASILY REMOVED IN ELECTROCHEMICAL
SOLUTIONS. THE CRITERIA OF A GOOD ELECTROCHEMICAL
DEBURRING SOLUTION WERE LEVELING CHARACTERISTICS AND
REMOVAL RATE. VARIOUS SOLUTIONS WERE EVALUATED FOR
BREAKING SHARP EDGES ON MOLYBDENUM, AMONG THEM BEING
25% BY WEIGHT NITRIC ACID, NITRIC-HYDROFLUORIC ACID
SOLUTION FOR MILLING MOLYBDENUM AND VARIATIONS OF
TURCO 105 STEEL ETCHANT. THESE SOLUTIONS WERE
SUCCESSFUL IN A LEVELING ACTION ON SHARP BURRS, BUT
WOULD NOT ROUND THE SIDE EDGES. A COMBINATION OF
NITRIC ACID LEVELING AND SIDE EDGE BURNISHING
PRODUCED THE MOST PROMISING RESULTS. ALUMINUM AND
STAINLESS STEEL DEBURRING WAS EVALUATED IN
PROPRIETARY SOLUTIONS, WITH GOOD RESULTS OBTAINED IN
POLISHING AND BREAKING OF SHARP EDGES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-431 617

MCDONNELL AIRCRAFT CORP ST LOUIS MO

DETERMINATION OF MECHANICAL PROPERTIES AND SURFACE
CONDITION OF CHEM-MILLED CB-5ZR COLUMBIUM ALLOY
SAMPLES.

(U)

MAR 64 7P JACOBUS, H. :

REPT. NO. A473

CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*NIOBIUM ALLOYS, MECHANICAL PROPERTIES),
(*MECHANICAL PROPERTIES, NIOBIUM ALLOYS), SURFACE
PROPERTIES, CHEMICAL MILLING, TENSILE PROPERTIES,
ZIRCONIUM ALLOYS, EXPERIMENTAL DATA, METALLOGRAPHY (U)
IDENTIFIERS: 1964, CB-5ZR NIOBIUM ALLOY (U)

MECHANICAL PROPERTIES AND SURFACE CONDITION OF CHEMICALLY
MILLED SPECIMENS OF CB-5ZR NIOBIUM ALLOY.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-433 118

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PACKAGING MINIATURIZATION. CHARGE NUMBERS 31-8027-
D201-01, 31-8027-0901 AND RES 2 AND 4, (U)

SEP 61 137P ABE, SHIRO ; CHURCHON, STUART ;
NEWMAN, H. L. ;
REPT. NO. R5832 3 80 61 41

UNCLASSIFIED REPORT

DESCRIPTORS: (*MODULES (ELECTRONIC), MANUFACTURING
METHODS), (*MANUFACTURING METHODS, MODULES
(ELECTRONIC)), (*SWITCHING CIRCUITS, MODULES
(ELECTRONIC)), AMPLIFIERS, POWER, ENCAPSULATION,
TRANSISTORS, PRODUCTION, RESISTORS, CAPACITORS, WELDING,
CHEMICAL MILLING, MINIATURE ELECTRONIC EQUIPMENT,
PACKAGED CIRCUITS, TABLES, ELECTRICAL PROPERTIES,
PERFORMANCE (ENGINEERING), DIODES (SEMICONDUCTOR),
ELECTRIC TERMINALS, SOLDERING, WIRING DIAGRAMS, PRINTED
CIRCUITS, TEMPERATURE, CONFIGURATION, RELIABILITY
(ELECTRONICS) (U)

IDENTIFIERS: 1961 (U)

HIGH POWER AMPLIFIER PARA-PLATE MODULES
WERE BUILT AND FUNCTIONALLY TESTED. A FEW
PROTOTYPE MODULES USING WELD PACK AND CHEM-
MILL TECHNIQUES WERE CONSTRUCTED. SOME PROTOTYPE
PARA-PLATE LOW POWER FLIP FLOPS WERE ASSEMBLED
BUT NOT EVALUATED. SEVERAL OTHER VERSIONS OF THE
LOW POWER FLIP FLOP WERE INVESTIGATED. THIS REPORT
DESCRIBES THE DESIGN WORK AND INCLUDES ILLUSTRATIONS
AND TABLES PLUS PRELIMINARY TEST RESULTS, LAYOUT
ARTWORK, DRAWINGS, ENCAPSULATION TECHNIQUES,
CONCLUSIONS AND RECOMMENDATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZCML6

AD-433 891

XEROX CORP ROCHESTER N Y

LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 OCT 63-1
JAN 64,

JAN 64 55P MYTYCH,C. ;

CONTRACT: DA36 D39AMC03257E

UNCLASSIFIED REPORT

DESCRIPTORS: (*MICROMINIATURIZATION (ELECTRONICS),
MANUFACTURING METHODS), (*FIXED RESISTORS,
MICROMINIATURIZATION (ELECTRONICS)), (*FIXED CAPACITORS,
MICROMINIATURIZATION (ELECTRONICS)), PHOTO ENGRAVING,
VAPOR PLATING, VACUUM APPARATUS, ENVIRONMENTAL TESTS,
PRINTED CIRCUITS, MODULES (ELECTRONIC), METAL COATINGS,
COPPER, CHROMIUM, CHEMICAL MILLING, METAL FILMS (U)
IDENTIFIERS: 1964, DOUBLE-ETCH PROCESS, MULTILAYERED
FILMS (U)

AN APPROACH TO LOW-COST RESISTOR AND CAPACITOR
ELEMENTS UTILIZING THE MICROELEMENT WAFER CONCEPT AND
THE DOUBLE-ETCH PROCESS IS UNDER INVESTIGATION.
MULTI-LAYERED FILMS WERE PLACED ON CERAMIC
SUBSTRATES BY VACUUM AND ELECTROLESS DEPOSITION
TECHNIQUES TO FORM MICROELEMENT WAFERS. THE MULTI-
LAYERED FILMS ARE CONVERTED TO RESISTOR AND CAPACITOR
ELEMENTS BY SUBTRACTIVE METHODS, UTILIZING
XEROGRAPHIC STENCILING AND SELECTIVE ETCHING. DATA
COVERING T.C.R., TEMPERATURE CYCLING, LOAD LIFE
STABILITY AND YIELD FOR RESISTOR ELEMENTS IS
PRESENTED. THE CAPACITOR AND MICROMODULE ASSEMBLY
PROGRAMS ARE OUTLINED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-438 138

GENERAL DYNAMICS/FORT WORTH TEX

MATERIAL BERYLLIUM WAFFLE PANEL. CHEMICAL MILLED,
SHEAR TEST OF.

(U)

APR 64 13P MAY, J. ;
REPT. NO. FDM 3068

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, PANELS (STRUCTURAL)), (*PANELS
(STRUCTURAL), BERYLLIUM), CHEMICAL MILLING, SHEAR
STRESSES, LOADING (MECHANICS), STRAIN (MECHANICS) (U)

SHEAR TEST OF CHEMICAL MILLED BERYLLIUM WAFFLE PANEL.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-438 478

NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB

STUDY OF SIZE EFFECT IN FINE BERYLLIUM WIRE PHASE II,
(U)

MAR 64 2P SOLTIS, PAUL ;
REPT. NO. NAEC-AML-1909

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, WIRE), (*METALLIC TEXTILES,
BERYLLIUM), FIBERS, TENSILE PROPERTIES, CHEMICAL
MILLING, TEST EQUIPMENT, HARDNESS, GRAIN STRUCTURES
(METALLURGY), PHOTOMICROGRAPHY, FRACTURE (MECHANICS),
DUCTILITY, SCALE (U)

THE 0.0046-IN. DIAMETER, AS-DRAWN, BERYLLIUM WIRE
CAN BE CHEMICAL-MILLED TO SIZES NEAR 0.0010 IN.
DIAMETER WHICH SHOW DIMENSIONAL UNIFORMITY AND GOOD
SURFACE QUALITY. A CONTINUOUS TREND TOWARD HIGHER
STRENGTH WITH DECREASING DIAMETER OF THE WIRE WAS
NOTED, AND IT APPEARS POSSIBLE THAT ULTRAFINE WIRE
WITH STRENGTH APPROACHING THE 200,000 PSI LEVEL CAN
BE PRODUCED WITH CONSISTENCY. A GOOD DEGREE OF
DUCTILITY WAS NOTED IN WIRE CHEMICAL-MILLED BELOW
0.0025-IN. DIAMETER AS EVIDENT IN NECKING OF
SPECIMENS; ALTHOUGH, THIS DUCTILITY DID NOT APPEAR IN
TENSILE ELONGATION VALUES. FRACTURE STRENGTHS IN
WIRE SHOWING DUCTILE FRACTURES REACHED VALUES NEAR
220,000 PSI. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-450,549

BIGNETICS CORP SUNNYVALE CALIF

AN ECONOMICAL FLAT PACKAGE FOR INTEGRATED
CIRCUITS.

(U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. NO. 1, 15
JUNE 15 SEP 64.

SEP 64 22P

CONTRACT: NOBSR91298

UNCLASSIFIED REPORT

DESCRIPTORS: (*PACKAGING, INTEGRATED CIRCUITS),
(*INTEGRATED CIRCUITS, PACKAGING), CIRCUIT
INTERCONNECTIONS, METAL FILMS, CHEMICAL MILLING,
ELECTROPLATING, PRODUCTION, MANUFACTURING METHODS,
SILICON, ALUMINUM

(U)

THE SCHEDULE FOR MAKING THE FIRST SEAL OF THE METAL
LEADS TO THE PACKAGE SUBSTRATE IS COMPLETE. BY A
PROCESS OF ELECTROPLATING AND ETCHING METAL FILM
INTERCONNECTIONS HAVE BEEN LAID DOWN, BUT MANY
PROBLEMS REMAIN IN THIS AREA. A FEW CIRCUITS WERE
ASSEMBLED ON THIS SUBSTRATE AND WHERE ALL PREVIOUS
STEPS WERE SATISFACTORY, ELECTRICAL CONTINUITY HAS
BEEN ESTABLISHED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-453 855
HONEYWELL RESEARCH CENTER HOPKINS MINN

THIN FILM IMAGE CONVERTER.

(U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL PROGRESS REPT. NO. 6,
24 JUL-23 OCT 64,
NOV 64 IV KRUSE, PAUL W. ; PRIBBLE,
FRED C. ; SCHULZE, RICHARD G. ;
CONTRACT: DA44 009AMC168T
PROJ: 2F23 11 001 07

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, INFRARED IMAGES),
(*INFRARED IMAGES, SEMICONDUCTING FILMS), EPITAXIAL
GROWTH, THICKNESS, GALLIUM ALLOYS, ARSENIC ALLOYS,
GERMANIUM, ELECTRICAL PROPERTIES, CHEMICAL MILLING,
DIFFUSION, PROCESSING, FIXED CONTACTS, RESISTANCE
(ELECTRICAL), PHOSPHORUS ALLOYS, METAL COATINGS, GOLD,
SILVER, NICKEL, DIODES (SEMICONDUCTOR) (U)
IDENTIFIERS: IMAGE CONVERTERS, ETCHING, THICK
FILMS (U)

EFFORTS WERE CONTINUED ON A PROGRAM TO CONDUCT
FUNDAMENTAL STUDIES OF NEW APPROACHES TO IMAGE
CONVERSION. THE EMPHASIS HAS BEEN UPON EVALUATION
OF A CONCEPT OF A SOLID STATE THIN FILM IMAGE
CONVERTER (TFIC). INVESTIGATIONS OF THE
EPITAXIAL GROWTH OF N-GAAS ON P-GE HAVE MADE IT
POSSIBLE TO PREPARE 200 MICRON THICK LAYERS OF
SINGLE CRYSTAL GAAS ON GE. AN EVALUATION OF
THE ELECTRICAL PROPERTIES OF SAMPLES ETCHED TO A MESA
CONFIGURATION, TOGETHER WITH CHEMICAL STAINING
STUDIES OF ANGLE LAPPED SAMPLES, REVEAL THAT AN N-
GE LAYER IS FORMED BETWEEN THE N-GAAS AND P-
GE REGIONS DURING THE INITIAL STAGES OF GROWTH.
THE MOST PROBABLE DONOR IS AS, DIFFUSED FROM THE
VAPOR INTO THE GE. METHODS FOR PREPARING
STRONG, OHMIC, LOW RESISTANCE CONTACTS TO N-GAAS,
P-GAAS, N-GAP, AND P-GAP HAVE BEEN
DEvised UTILIZING ULTRASONIC SOLDERING. THE BEST
TECHNIQUES ARE SUMMARIZED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMI 6

AD-468 378

JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB

THE MINISTICK PROCESS FOR PACKAGING INTEGRATED
CIRCUIT FLAT PACKS.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,

APR 65 39P NOYES, CARLTON F. ;

REPT. NO. TG-675

CONTRACT: N0W62 0604C

UNCLASSIFIED REPORT

DESCRIPTORS: (•INTEGRATED CIRCUITS, PACKAGING),
(•PRINTED CIRCUITS, PACKAGING), PROCESSING,
MANUFACTURING METHODS, TEMPLATES, CHEMICAL
MILLING, GLASS TEXTILES, EPOXY PLASTICS, LAMINATED
PLASTICS, BONDING, DIELECTRICS,
MODULES (ELECTRONIC), WELDING
IDENTIFIERS: MINISTICK PROCESS, SUBSTRATES

(U)

(U)

THE MINISTICK PROCESS FOR FABRICATING FLAT-PACK
TYPE MULTILAYER CIRCUITRY BOARDS HAS BEEN DEVELOPED
BECAUSE OF THE NEED FOR SPACE CIRCUITRY THAT MEETS
EASE OF DESIGN AND MANUFACTURE REQUIREMENTS.
STARTING WITH A CIRCUIT DESIGN IN THE FORM OF A
LOGIC DIAGRAM, THE DESIGN PHASE PROGRESSES TO THE
FINAL ARTWORK TEMPLATE. THIS TEMPLATE, PHOTO
REDUCED, IS THE BASIC TOOL IN THE FABRICATION OF THE
ASSEMBLY FRAMES. THE CIRCUIT OF EACH LAYER OF AN
ASSEMBLY FRAME IS PRODUCED BY CHEMICALLY MILLING
SUBSTRATES WHICH HAVE BEEN SENSITIZED WITH THE
DESIRED CIRCUIT BY USE OF THE FINAL ARTWORK TEMPLATE.
THESE SUBSTRATES ARE MADE BY LAMINATING AN EPOXY
GLASS CLOTH DIELECTRIC MATERIAL TO A KOVAR SHEET.
INDIVIDUAL CIRCUIT LAYERS ARE THEN COMBINED TO FORM
AN ASSEMBLY FRAME. AND INTEGRATED CIRCUIT MODULES
ARE WELDED TO THE FRAME TO COMPLETE THE CIRCUITRY.
WHEN MORE THAN ONE ASSEMBLY FRAME IS REQUIRED TO
COMPLETE THE CIRCUITRY, THE FRAMES ARE ELECTRICALLY
CONNECTED BY MEANS OF A MOTHER BOARD. ALTHOUGH
MULTILAYER CIRCUIT BOARDS ARE USED IN THIS PROCEDURE,
NO INTERLAYER CONNECTIONS ARE REQUIRED. (AUTHOR)

(U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-485 297 13/8 11/6
AIR FORCE MACHINABILITY DATA CENTER CINCINNATI OHIO

MACHINING DATA FOR BERYLLIUM METAL, (U)

JUN 66 22P SNIDER, ROBERT E. KAHLES,
JOHN F. ;
REPT. NO. AFMDC-66-3
CONTRACT: AF 33(615)-5262
PROJ: AF-9-700

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM ALLOYS, *MACHINING),
(*BERYLLIUM, MACHINING), TOXICITY, CRYSTAL
LATTICE DEFECTS, TWINNING(CRYSTALLOGRAPHY),
FRACTURE(MECHANICS), CHEMICAL MILLING,
MATERIAL REMOVAL, TENSILE PROPERTIES, HARDNESS,
CARBIDES, MECHANICAL PROPERTIES,
MICROSTRUCTURE (U)

THIS REPORT CONTAINS EVALUATED MACHINING
INFORMATION FOR BERYLLIUM WHICH HAS BEEN EXTRACTED
FROM MANY SOURCES. MACHINING DATA ARE TABULATED
AND PRESENTED IN CHART FORM FOR THE FOLLOWING
PROCESSES: TURNING, MILLING, DRILLING, BAND SAWING,
GRINDING, BORING, TREPPANNING, REAMING, ROUTING,
TAPPING, ELECTRICAL DISCHARGE MACHINING,
ELECTROCHEMICAL MACHINING, AND CHEMICAL MACHINING.
ALSO INCLUDED IS A GENERAL COMMENT SECTION DEALING
WITH THE PROBLEMS ASSOCIATED WITH BERYLLIUM
MACHINING, SUCH AS TWINNING, MICROCRACKING, TOXICITY,
CHIPOUT AND SPALLING, AND CUTTING FLUIDS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-603 460

MOTOROLA INC PHOENIX ARIZ

PRODUCTION ENGINEERING MEASURE. HIGH SPEED
SEMICONDUCTOR SWITCH (TWO TERMINAL) HIGH SPEED
SEMICONDUCTOR SWITCH (GATE).

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 29 FEB-28 MAY
64.

MAY 64 32P BURLINGAME, B. G. I

CONTRACT: DA36 D39AMC01475E

UNCLASSIFIED REPORT

DESCRIPTORS: (•ELECTRONIC SWITCHES, SEMICONDUCTOR
DEVICES), (•SEMICONDUCTOR DEVICES, MANUFACTURING
METHODS), BONDING, ULTRASONIC RADIATION, ELECTRIC
TERMINALS, DESIGN, PACKAGING, DIODES (SEMICONDUCTORS),
DISKS, CHEMICAL MILLING, EPITAXIAL GROWTH, DIFFUSION,
METAL COATINGS, ALLOYS, ELECTRICAL PROPERTIES, VAPOR
PLATING, GOLD, BORON, ALUMINUM, PHOSPHORUS, TEST
EQUIPMENT (ELECTRONICS)

(U)

A PILOT PRODUCTION FACILITY CAPABLE OF PRODUCING
HIGH SPEED SEMICONDUCTOR SWITCHES IN ACCORDANCE WITH
SIGNAL CORPS TECHNICAL SPECIFICATIONS IS
CONSIDERED. THE MAJOR PROBLEM AREAS TO BE OVERCOME
IN ORDER TO ACHIEVE THE PURPOSE OF THIS PROGRAM ARE
FORWARD BREAKOVER VOLTAGE AND CURRENT ON THE TWO-
TERMINAL DEVICE, FORWARD BLOCKING CURRENT ON THE
THREE-TERMINAL DEVICE, AND SWITCHING SPEEDS, CURRENT
CARRYING CAPABILITIES, FORWARD ANODE VOLTAGE, AND
RATE OF FORWARD VOLTAGE RISE ON BOTH DEVICES. WORK
PERFORMED DURING THE PERIOD 29 FEBRUARY 1964
THROUGH 28 MAY 1964 IS COVERED. PACKAGE DESIGNS
FOR BOTH DEVICES ARE DISCUSSED, AND PROGRESS MADE ON
ASSEMBLY METHODS, GOLD DIFFUSION, EPITAXIAL, ALLOY,
AND MOAT-ETCHING PROCEDURES IS REPORTED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-605 425

HARSHAW CHEMICAL CO CLEVELAND OHIO

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.

(U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 3, 26 MAY-25 AUG 64.

AUG 64 8P SCHAEFER, J. C. HUMRICK, R. J. ;

BELT, R. F. ;

CONTRACT: AF33 415 1249

PROJ: 8173

TASK: 817301, 817332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-601 459.

DESCRIPTORS: (*SOLAR CELLS, FILMS), (*CADMIUM COMPOUNDS, SULFIDES), ENERGY CONVERSION, BATTERIES AND COMPONENTS, ELECTROPLATING, VAPOR PLATING, DEGRADATION, CHEMICAL MILLING, COPPER COMPOUNDS, CHLORIDES, SILICON COMPOUNDS, MONOXIDES, SURFACE PROPERTIES, EFFECTIVENESS (U)

IDENTIFIERS: THIN FILMS (M)

THE DEGRADATION OF ELECTROPLATED CELLS HAS BEEN CLOSELY OBSERVED AND IT HAS BEEN FOUND THAT RECOVERY CAN BE ACCOMPLISHED UNDER PROPER CONDITIONS. CHEMICAL MILLING OF THE SUBSTRATE IS AN EXCELLENT METHOD FOR PRODUCING HIGH POWER TO WEIGHT RATIO CELLS. FABRICATION OF THE ONE-HALF AND ONE SQUARE FOOT MECHANICAL SAMPLE ARRAYS INDICATE IMPROVED TOTAL AREA UTILIZATION FACTORS. PHOTOVOLTAIC CELLS AND DIODES HAVE BEEN PREPARED BY FIRST DEPOSITING A THIN FILM OF CUCL ON CDS. THE CUCL WAS SUBSEQUENTLY CONVERTED TO CU₉SSS BY MEANS OF H₂S. OPTICAL STUDIES ON ELECTROPLATED AND CHEMPLATED BARRIERS HAVE SERVED TO CONFIRM THE PRESENCE OF CU₂S ALONE OR MIXED WITH CU₂S. THIN LAYERS OF SiO₂ HAVE BEEN UTILIZED AS A WATER VAPOR BARRIER TO SIGNIFICANTLY DECREASE DEGRADATION OF CELLS. ADDITIONAL THEORETICAL WORK HAS BEEN PERFORMED ON A HETEROJUNCTION MODEL OF THE CELL OPERATION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#606 191

SILICON TRANSISTOR CORP GARDEN CITY N Y

PRODUCTION ENGINEERING MEASURE TO INCREASE THE
RELIABILITY OF THE TRANSISTOR TYPE 2N2034. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 APR-
30 JUN 64.

JUN 64 29P COCKING, J. ; COURIER, J. ;

DES ROCHES, F. ; HUGHES, D. ; MARTIN, E. ;

CONTRACT: DA36 039AMC01482E

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, RELIABILITY (ELECTRONICS)),
PROCESSING, DISKS, SILICON, CLEANING, ABRASIVE BLASTING,
SOLDERING, CHEMICAL MILLING, ENCAPSULATION, WELDING,
HERMETIC SEALS, TESTS, CONTROLLED ATMOSPHERES,
PERFORMANCE (ENGINEERING), NICKEL, PELLETS (U)

THE REPORT DESCRIBES THE PROCESSING DEVELOPMENTS IN
WAFER CLEANING, MESA DELINEATION, SCRIBING OF WATER,
PELLET TO NICKEL-PLATED HEADER SOLDERING, NICKEL-
PLATED CLIP TO PELLETS SOLDERING, FINAL ETCH OF
SOLDERED UNIT, FINAL TEST AND ENCAPSULATION OF ETCHED
UNITS, AND WELD AND HERMETIC SEAL TESTS FOR THE
TRANSISTOR TYPE 2N2034. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-606 477

CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION
TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600
SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 APR-30 JUN
84.

JUN 64 40P WILLIAMS, JOHN R. ;
CONTRACT: DA36 039AMC01483E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART
UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST
AVAILABLE COPY. SEE ALSO AD-601 433.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*RELIABILITY (ELECTRONICS), TRANSISTORS), BONDING,
DIES, CHEMICAL MILLING, VACUUM FURNACES, CONTROLLED
ATMOSPHERES, ENCAPSULATION, INDUSTRIAL EQUIPMENT (U)

ULTRASONIC BONDING HAS BEEN DISCARDED IN PREFERENCE
TO A NEW-METALLIZATION BALL-BONDING TECHNIQUE. ALL
PRODUCTION FETS ARE BEING DIE-TO-HEADER BONDED
USING A HEAVY GOLD PLATE ON DICE AND HEADERS. A
SLIGHT MODIFICATION HAS BEEN MADE IN THE MASK DESIGN
TO FACILITATE BONDING. MESA ETCHING FIXTURES AND
SLICE PREPARATION FIXTURES ARE COMPLETE AND ARE IN
USE IN THE PRODUCTION PROCESS. VARIOUS EXPERIMENTS
HAVE BEEN RUN UTILIZING VARIOUS DEW POINT AMBIENTS,
COATING AGENTS, AND BAKEOUTS. AS A RESULT,
PRODUCTION UNITS ARE BEING VACUUM BAKED AT 200C.
AND PACKAGED IN A DRY NITROGEN ATMOSPHERE OF -60C.
DEW POINT OR BETTER. LIFE TEST RACKS ARE BEING
CONSTRUCTED. A MANUAL OF Q.C. PROCEDURES HAS
BEEN PREPARED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-606 819

MARTIN CO DENVER COLO

MANUAL AND REPAIR WELDING OF CHEMICALLY MILLED 2014-T6 ALUMINUM SHEETING. (U)

AUG 57 27P AGRICOLA, K. R. ;
REPT. NO. WDD-M-MI-57-60

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAD BEEN MADE FROM BEST AVAILABLE COPY.

DESCRIPTORS: (ALUMINUM ALLOYS, WELDING), (WELDING, ALUMINUM ALLOYS), SHEETS, CHEMICAL MILLING, WELDS, TENSILE PROPERTIES, HARDNESS, PANELS (STRUCTURAL), MAINTENANCE (U)
IDENTIFIERS: ALUMINUM ALLOY 2014-T6 (U)

A 2 INCH WIDE LAND 0.100 IN. THICK, WILL FULLY RETAIN THE WELD HEAT-AFFECTED ZONE OF REPAIRED WELDS (BASED ON HARDNESS DATA). PARENT METAL PROPERTIES ARE ONLY SLIGHTLY AFFECTED BY WELD HEAT ON REPAIRS OF 1.5 INCH LANDS. VALUES OF 59,000 PSI CAN BE EXPECTED WITH 90 PERCENT CONFIDENCE FOR REPAIRED 1.5 INCH LANDS. IF 95 AND 99 PERCENT CONFIDENCE IS REQUIRED, EXPECTED VALUES FOR REPAIRED 1.5 INCH LANDS ARE 57,000 AND 55,400 PSI. IF LAND WIDTHS OF 1.625 INCHES AND ABOVE ARE USED, PARENT METAL STRENGTH CAN BE EXPECTED FOR MANUAL WELDS FOLLOWED BY REPAIR WELDS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-607 426

WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD

FAILURE MECHANISMS IN MICROELECTRONICS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.

AUG 64 100P

REPT. NO. WDSC-385A4

CONTRACT: AF30 602 3017

PROJ: 5519

TASK: 551906

MONITOR: RADC .

TDR64 252

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST AVAILABLE COPY.

DESCRIPTORS: (*MICROMINIATURIZATION (ELECTRONICS), FAILURE (MECHANICS)), (*FAILURE (MECHANICS), MICROMINIATURIZATION (ELECTRONICS)), DIODES (*SEMICONDUCTOR), DISKS, TRANSISTOR AMPLIFIERS, SILICON COMPOUNDS, OXIDES, SURFACE PROPERTIES, ELECTRICAL PROPERTIES, CHEMICAL MILLING, STRESSES, ELECTRICAL CONDUCTANCE, ELECTRONIC EQUIPMENT, RELIABILITY (ELECTRONICS), SILICON

(U)

INVESTIGATIONS WERE PERFORMED ON THREE TYPES OF MICROELECTRONIC DEVICES: MULTIPLE DIODE WAFERS, INVERSION LAYER DIODE AMPLIFIERS, AND VERSATILE LINEAR AMPLIFIERS. TWO FAILURE MECHANISMS WERE IDENTIFIED AND STUDIED IN DETAIL: UNSUSPECTED DIFFUSION BARRIERS FROM PHOTOETCH PROCEDURES, AND VARIATIONS IN PASSIVATION LAYER PROPERTIES. THE RELATIONSHIP TO THESE, OF CURRENT AMPLIFICATION (BETA), OR REVERSE VOLTAGE BREAKDOWN, OF LEAKAGE, AND OTHER QUANTITIES WAS EXAMINED. EACH STEP IN MICROELECTRONIC DEVICE FABRICATION WAS INVESTIGATED FOR ITS CONTRIBUTION TO FAILURE MECHANISMS. A PARTIALLY CONDUCTING REGION IN THE PASSIVATING OXIDE WAS IDENTIFIED AND STUDIED, 300-100 A FROM THE SILICON. THIS CONTRIBUTES TO THE LEAKAGE IN MICROELECTRONIC DEVICES USUALLY ATTRIBUTED ENTIRELY TO CHANNELS IN THE SILICON. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD4609 349

BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

A SURVEY OF THE COMPARATIVE COSTS OF FABRICATING
AIRFRAME FROM ALUMINUM AND FROM TITANIUM.

(U)

DESCRIPTIVE NOTE: TECHNICAL NOTE.

APR 64 20P

UNCLASSIFIED REPORT

DESCRIPTORS: (*TITANIUM ALLOYS, AIRFRAMES), (*AIRFRAMES,
COSTS), (*ALUMINUM ALLOYS, AIRFRAMES), MATERIAL FORMING,
SHEETS, MACHINING, WELDING, CHEMICAL MILLING, FORGING,
HEAT TREATMENT, SUPERSONIC PLANES, TRANSPORT PLANES (U)

BY PROCESS, THE COST RATIOS FOR FABRICATING
TITANIUM AND ALUMINUM ARE ABOUT AS FOLLOWS: SHEET
FORMING 1.5-2 TO 1, MACHINING 1.5-2 TO 1,
WELDING .8-2 TO 1, CHEMICAL MILLING 3-4 TO 1,
ASSEMBLING 1.1 TO 1, FORGING 1.5-2.3 TO 1, HEAT
TREATING 1.5-5 TO 1. THE CURRENT COST ESTIMATES
MADE BY THE EXPERIENCED TITANIUM FABRICATORS
REPRESENT REALISTIC MINIMUM COST RATIOS FOR THE NEXT
2 OR 3 YEARS. THEY ARE RATIOS WHICH THE LESS
EXPERIENCED FABRICATORS SHOULD BE ABLE TO APPROACH IN
ACTUAL PRODUCTION. THE EXPERIENCED FABRICATORS
COULD PROBABLY NOT IMPROVE ON THEM GREATLY IN THE
NEXT YEAR OR TWO. THE ABOVE COST RATIOS APPLY ONLY
TO SPECIFIC FABRICATION OPERATIONS (SUCH AS
FORMING, MACHINING, WELDING, ETC.). THESE
OPERATIONS ACCOUNT FOR ONLY A FRACTION OF THE TOTAL
COST OF MANUFACTURING AN AIRCRAFT. MOST OF THE
MANUFACTURING COSTS NOT COVERED BY THESE OPERATIONS
WOULD BE LARGELY UNAFFECTED BY THE CHOICE OF AIRFRAME
MATERIAL. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-610 434

FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND
DEVELOPMENT

RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND
DISLOCATION NETWORKS IN METALLIC CRYSTALS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 APR 60-30 APR 62,
APR 62 48P DAMIANO, V. V. ITINT, G. S. I

HERMAN, M. I

REPT. NO. F-A2400

CONTRACT: AF49 638 821

MONITOR: AFOSR , 2574

UNCLASSIFIED REPORT

DESCRIPTORS: (*METALLIC CRYSTALS, CRYSTAL STRUCTURE),
(*CRYSTAL STRUCTURE, METALLIC CRYSTALS), CRYSTAL
SUBSTRUCTURE, CRYSTAL LATTICE DEFECTS, CRYSTALS, ZINC,
IMPURITIES, CADMIUM, CHEMICAL MILLING, PHOTOMICROGRAPHY,
CRYSTALLOGRAPHY (U)

THE THREE DIMENSIONAL ASPECTS OF DISLOCATION
SUBSTRUCTURES WERE STUDIED IN CADMIUM DOPED ZINC
CRYSTALS GROWN FROM THE MELT. PRECIPITATES
DELINEATING THE DIS LOCATIONS WERE REVEALED BY
ETCHING A SURFACE CLOSELY PARALLEL TO THE SLIP PLANE.
USING A TECHNIQUE OF CONTINUOUS ETCHING AND
CINEPHOTOMICROGRAPHY, THE COURSE OF THE DISLOCATIONS
WAS FOLLOWED THROUGH THE CRYSTAL. TANGLES OF
DISLOCATIONS WERE OBSERVED IN DEFORMED CRYSTALS.
AFTER ANNEALING A REARRANGEMENT OF DISLOCATIONS
INTO LOW-ANGLE AND HEXAGONAL NETWORKS WAS EVIDENCED.
CLOSED LOOPS AND SPIRAL DISLOCATIONS WERE FOUND TO
BE ASSOCIATED WITH LARGE INCLUSIONS. A MECHANISM
FOR THE MULTIPLICATION OF DISLOCATIONS AT INCLUSIONS
WAS PROPOSED. DISLOCATION REACTIONS ACCOUNTING FOR
THE OBSERVED SUBSTRUCTURES HAVE BEEN PROPOSED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD#612 617.

TEXAS INSTRUMENTS INC DALLAS

PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM
MICROWAVE TRANSISTOR. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 30

JUN-30 SEP 64.

SEP 64 79P

REPT. NO. 03-64-73

CONTRACT: DA36 039AMCn3632E

PROJ: 74057

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*MICROWAVE EQUIPMENT, TRANSISTORS), (*GERMANIUM,
TRANSISTORS), GAIN, NOISE (RADIO), VAPOR PLATING,
SILICON COMPOUNDS, DIOXIDES, PACKAGING, ENCAPSULATION,
INDUCTANCE, GALLIUM, IMPURITIES, VACUUM APPARATUS,
CHEMICAL MILLING, DIFFUSION, ARSENIC, GOLD, RELIABILITY
(ELECTRONICS) (U)

THE PROCESS FLOW USED IN FABRICATING THE L-78
PLANAR EPITAXIAL GERMANIUM DIFFUSED-BASE TRANSISTOR
IS DESCRIBED. THE INITIAL INTRINSIC F SUB T OF
PLANAR DEVICES, APPROXIMATELY 1600 MC COMPARED TO
2050 MC FOR A MESA DEVICE OF COMPARABLE DESIGN USING
SIMILAR FABRICATION TECHNIQUES, WAS INCREASED TO
EQUAL THAT OF THE MESA BY OPTIMIZING THE COMPOSITION
OF THE EMITTER MATERIAL. THE L-78 PLANAR DEVICES
FABRICATED EXHIBIT MINIMUM NOISE FIGURE AT 1.0
GGGC OF 4.5 TO 5.5 DB AT APPROXIMATELY 1.5 MA OF
EMITTER CURRENT WHILE PEAK F SUB T OCCURS AT
APPROXIMATELY 5.0 MA. A MODIFICATION OF THE L-78
PATTERN, DESIGNATED L-78A, VIA EMITTER AREA
REDUCTION FROM 0.76 MIL SQUARED TO 0.27 MIL SQUARED
MANIFESTED ITSELF BY A SHIFT IN PEAK F SUB T TOWARD
LOWER VALUES OF EMITTER CURRENT. THE PURPOSE OF
THIS MODIFICATION IS TO BRING INTO REGISTRY THE E
PEAK GAIN OF THE DEVICE AND MINIMUM NOISE FIGURE AT
ONE PARTICULAR BIAS LEVEL. THE MATERIALS USED FOR
THE BASE STRIPES OF THE PLANAR UNIT WERE OPTIMIZED TO
PROVIDE GOOD OHMIC CONTACT TO GERMANIUM. ADHERENCE
OF EXPANDED CONTACTS TO THE ACTIVE REGION OF THE
DEVICE, THE EMITTER AND BASE STRIPES, WAS IMPROVED BY
EMPLOYING A CHEMICAL ETCH COMPRISED OF INORGANIC
CONSTITUENTS. AN EXCELLENT TECHNIQUE FOR UNIFORMLY
DEPOSITING SILICON DIOXIDE ONTO GERMANIUM WAS
OBTAINED.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-613 068
CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION
TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600
SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 OCT-31 DEC
64.

DEC 64 25P WILLIAMS, JOHN R. ;
CONTRACT: DA36 D39AMC01483E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AVAILABLE COPY WILL NOT PERMIT FULLY
LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF
REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC
SALE. SEE ALSO AD-609 596.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*RELIABILITY (ELECTRONICS), TRANSISTORS), SILICON,
PROCESSING, BORON, PHOSPHOROUS, DIFFUSION, CHEMICAL
MILLING, ETCHED CRYSTALS, BONDING, TESTS, DATA
PROCESSING SYSTEMS, PACKAGING, QUALITY CONTROL (U)
IDENTIFIERS: C600 TRANSISTORS, PERT (U)

THE PURPOSE OF THIS PROGRAM IS TO IMPROVE THE
RELIABILITY OF THE C600 SERIES FIELD EFFECT
TRANSISTORS BY SPECIFIC IMPROVEMENTS OF MANUFACTURING
TECHNIQUES. THE BASIC PROGRAM HAS BEEN OUTLINED IN
A PERT PLAN WHICH IS BEING USED AS A REFERENCE.
IN AN EFFORT TO ACHIEVE THE FAILURE RATE OBJECTIVE,
THE FOLLOWING PROCESSES ARE TO BE IMPROVED: (1)
OXIDATION OF SLICES; (2) BORON DIFFUSION OF
SLICES; (3) MASK ALIGNMENT; (4) ETCHING
OF SLICES; (5) DIE-TO-HEADER BONDING; (6)
WIRE BONDING; (7) PACKAGING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-613 261

BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

METAL REMOVAL BY ELECTROCHEMICAL METHODS AND ITS
EFFECTS ON MECHANICAL PROPERTIES OF METALS, (U)

JAN 65 45P GURKLIS, JOHN A. I
REPT. NO. DMIC-213
CONTRACT: AF33 615 1121
PROJ: 8975

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTROEROSIVE MACHINING, METALS);
(*CHEMICAL MILLING, METALS); (*ELECTROLYTIC POLISHING,
METALS); MECHANICAL PROPERTIES, HYDROGEN EMBRITTLEMENT,
STEEL, BERYLLIUM, NICKEL ALLOYS, COBALT ALLOYS,
REFRACTORY METALS, REFRACTORY METAL ALLOYS, TITANIUM
ALLOYS, SURFACE PROPERTIES, OXIDATION (U)

THIS REPORT ASSEMBLES AND CORRELATES INFORMATION ON
THE EFFECTS OF ELECTROCHEMICAL METAL-REMOVAL (ECMR)
PROCESSES ON MECHANICAL PROPERTIES. OF SPECIAL
INTEREST AND CONCERN ARE THE EFFECTS OF ECMR ON
FATIGUE STRENGTH. THE REPORT COVERS FOUR
ELECTROCHEMICAL METAL-REMOVAL PROCESSES:
ELECTROCHEMICAL MACHINING (ECM), ELECTROLYTIC
GRINDING (EG), ELECTROCHEMICAL MILLING, AND
ELECTROPOLISHING. GENERAL CHARACTERISTICS AND
APPLICATIONS OF THE FOUR METHODS ARE PRESENTED AND
DISCUSSED; SPECIAL EMPHASIS IS PLACED ON ECM. THE
ECMR PROCESSES ARE ESPECIALLY USEFUL IN SHAPING
HIGH-STRENGTH AND DIFFICULT-TO-MACHINE METALS AND
ALLOYS, AS WELL AS IN SHAPING PARTS WITH UNUSUAL,
COMPLEX, OR FRAGILE CHARACTERISTICS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZQML6

AD-613 643

ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS

THE METALLOGRAPHY OF PYROLITIC GRAPHITE,

(U)

DEC 64 19P TARPINIAN, ARAM ;

REPT. NO. AMRA-TR-64-41

PROJ: 1A010501B010

TASK: 35183

UNCLASSIFIED REPORT

DESCRIPTORS: (•PYROLITIC GRAPHITE, MICROSTRUCTURE), ION
BOMBARDMENT, ARGON, MERCURY, CHEMICAL MILLING,
ELECTROLYTIC POLISHING

(U)

ETCHING OF PYROLITIC GRAPHITE BY BOTH ARGON ION
BOMBARDMENT AND MERCURY ION BOMBARDMENT IS DESCRIBED.
THE DIFFERENCE BETWEEN THE MICROSTRUCTURES REVEALED
BY THE TWO METHODS IS DISCUSSED, AND AN
INTERPRETATION IS SUGGESTED. ARGON ION BOMBARDMENT
CREATES A LEAF-LIKE PATTERN REMINISCENT OF STACKED
SHINGLES. MERCURY ION BOMBARDMENT REVEALS A
LAMINAR STRUCTURE UNLIKE THAT PRODUCED BY ARGON ION
BOMBARDMENT. ELECTROCHEMICAL POLISHING AND ETCHING
REVEALS MICROSTRUCTURES SIMILAR TO THOSE CREATED BY
ION BOMBARDMENT. USING AN ELECTROLYTE BASED ON
PHOSPHORIC ACID, MICROSTRUCTURES SIMILAR TO THOSE
RESULTING FROM MERCURY ION BOMBARDMENT ARE REVEALED.
REPLACING THE PHOSPHORIC ACID WITH NITRIC ACID
RESULTS IN MICROSTRUCTURES SIMILAR TO THOSE OBTAINED
BY ARGON ION BOMBARDMENT. BASED ON THE CORRELATION
BETWEEN MICROSTRUCTURES DEVELOPED BY ION BOMBARDMENT
AND ELECTROCHEMICAL ETCHING, IT IS CONCLUDED THAT THE
MICROSTRUCTURES REVEALED REPRESENT THE TRUE
STRUCTURE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-614 467

LINDEN LABS INC STATE COLLEGE PA

MACHINING HIGH PURITY ALUMINA.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 OCT-31 DEC 64,

DEC 64 27P MARSHALL, P. A. , JR. INFELD, J. M. :

CONTRACT: DA36 039AMC03634E

UNCLASSIFIED REPORT

DESCRIPTORS: (*MACHINING, *ALUMINA); SURFACE PROPERTIES; CHEMICAL MILLING; HYDROCHLORIC ACID; HYDROGEN COMPOUNDS; FLUORIDES; ACIDS; IMPREGNATION; SILICON COMPOUNDS; DIOXIDES; CUTTING TOOLS; DENSITY; HEAT TREATMENT IDENTIFIERS: HYDROFLUORIC ACID

(U)

(U)

MATERIAL A-96 SELECTED FOR THE MACHINING DEMONSTRATION CAN BE DRILLED, GROUND, THREADED, SLOTTED, TAPPED AND TURNED. THE MATERIAL CAN BE READILY REMOVED BY EITHER A GRINDING WHEEL OR A SINGLE POINT CUTTING TOOL. CARE MUST BE EXERCISED WHEN USING A SINGLE POINT CUTTING TOOL WITH REGARD TO FEEDS, SPEEDS, TOOL GEOMETRY, AND CUTTING ANGLES. THE CHEMISTRY BEHIND THE ACID TREATING AND THE RECONSTITUTION ARE NOT FULLY UNDERSTOOD. THE MATERIAL A-96 TREATED ALUMINA APPEARS TO BE ABLE TO BE RECONSTITUTED TO A DENSE BODY OF HIGHER PURITY THAN THE ORIGINAL BODY. HYDROFLUORIC ACID SEEMS TO ATTACK MOST BODIES MORE READILY THAN HYDROCHLORIC ACID AND 52% AQUEOUS HF SEEMS TO ATTACK MORE READILY THAN 70% AQUEOUS HF. THERE APPEARS TO BE SOME OPTIMUM PER CENT AQUEOUS ACID BETWEEN 70% AND 40%. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-614 523

NATIONAL SEMICONDUCTOR CORP DANBURY CONN

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION
TECHNIQUES AND INCREASE THE RELIABILITY OF THE
2N328A TRANSISTOR. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 30 JUN 63-30 DEC 64,

DEC 64 246P RAU, R. R. IDI PAOLA, R. I
CONTRACT: DA36 039AMC01480E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AVAILABLE COPY WILL NOT PERMIT FULLY
LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF
REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC
SALE. SEE ALSO AD-608 583.

DESCRIPTORS: (TRANSISTORS, MANUFACTURING METHODS),
RELIABILITY (ELECTRONICS), PRODUCTION, FAILURE
(MECHANICS), TESTS, SILICON ALLOYS, PROCESSING,
SPECIFICATIONS, QUALITY CONTROL, LIFE EXPECTANCY,
CHEMICAL MILLING, ALUMINUM, VAPOR PLATING, GAS ANALYSIS,
WELDING, HEATING, FURNACES, INDUSTRIAL EQUIPMENT (U)

A SUMMARY IS GIVEN OF THE WORK PERFORMED FOR
IMPROVING THE RELIABILITY OF THE PNP SILICON
ALLOY TRANSISTOR TYPE 2N328A. THE
FOLLOWING PROCESSES WERE MODIFIED DURING THE COURSE
OF THE CONTRACT: AN ETCH WHEEL WAS INTRODUCED TO
MORE ACCURATELY CONTROL FINAL DEVICE ETCHING;
ADDITIONAL BAKE-OUT FURNACES WERE INTRODUCED AND
EVALUATED TO INCREASE THE AMOUNT OF TIME WHICH THE
UNITS ARE HEATED AFTER ETCHING; A GAS RECIRCULATOR
WAS INTRODUCED INTO THE FINAL DRY LINE TO REDUCE THE
WATER VAPOR CONCENTRATION; WELDING SHIELDS WERE
INTRODUCED AT TWO WELDING OPERATIONS WHILE ONE OTHER
PROCESS WAS MODIFIED; ALL THESE CHANGES WERE MADE IN
ORDER TO DECREASE THE AMOUNT OF WELD SPLASH STRIKING
THE ACTIVE REGION OF THE TRANSISTOR. DEVICES
PRODUCED FOR THE FIRST MONTH OF OPERATION OF THE
IMPROVED MANUFACTURING LINE WERE USED FOR THE LONG
TERM RELIABILITY TESTING. MEASUREMENTS ON DEVICES
MADE DURING THIS PERIOD OF MANUFACTURE ARE INCLUDED.
THIS RELIABILITY EVALUATION CONSISTED OF
OPERATIONAL TESTS FOR A 1000 HOURS AT POWER LEVELS OF
400, 450, AND 500 MILLIWATTS; A SPECIFICATION FOR
AN IMPROVED 2N328A TYPE TRANSISTOR INCORPORATING
SOME OF THE RESULTS OF EVALUATIONS MADE DURING THIS
CONTRACT IS INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-616 786

RENSSELAER POLYTECHNIC INST TROY N Y

PRINCIPLES OF METALLOGRAPHIC ETCHING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

JUN 65 26P GREENE, NORBERT D. IRUDAW,

PETER S. LEE, LINDA ;

REPT. NO. TR-2

CONTRACT: NONR59117

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, ALLOYS),
(*METALLOGRAPHY, CHEMICAL MILLING), TIN ALLOYS,
ZINC ALLOYS, SODIUM COMPOUNDS, HYDROXIDES,
ELECTROLYTES, ANALYSIS

(U)

THE PRINCIPLES OF METALLOGRAPHIC ETCHING HAVE BEEN
DETERMINED BY ELECTROCHEMICAL AND OPTICAL
MEASUREMENTS ON TIN-ZINC ALLOYS IN SODIUM HYDROXIDE
ELECTROLYTES. THE MINIMUM DISSOLUTION RATE RATIO
AND THE MINIMUM AMOUNT OF SELECTIVE DISSOLUTION
NECESSARY TO ACHIEVE METALLOGRAPHIC CONTRAST OF
PHASES HAVE BEEN MEASURED. ETCHING RATE AND
CONTRAST ARE UNIQUELY DEFINED BY ETCHING POTENTIAL BY
POTENTIOSTATIC, ELECTROLYTIC AND CHEMICAL ETCHING
METHODS. (AUTHOR

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD615 628

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CHEMICAL MILLING,

(U)

JUL 65 7P RYBAK, P. T. ; SAVICH, V. V. ;
REPT. NO. FTD-TT-65-865
MONITOR: TT . 65-62694

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
MASHINOSTROITEL' (USSR) N3 P34-5 1964. AVAILABLE COPY
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DESCRIPTORS: (*CHEMICAL MILLING, MANUFACTURING
METHODS), USSR, PRINTED CIRCUITS, HEATING,
INFRARED RADIATION, AUTOMATION

(U)

TRANSLATION OF RUSSIAN RESEARCH: CHEMICAL MILLING.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#619 295

MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY
TRANSISTORS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 JAN-
31 MAR 65,

MAR 65 52P KEARKUFF, THOMAS ;

CONTRACT: DA36 039AMC06156E

PROJ: 74001

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*SILICON, TRANSISTORS), DIFFUSION, GOLD,
CHEMICAL MILLING, PRECISION FINISHING, PROCESSING,
ENCAPSULATION, BONDING, GLASS, WIRE, STORAGE,
EPITAXIAL GROWTH, RELIABILITY(ELECTRONICS)

(U)

NEW BASE PREDEPOSITION AND BASE DIFFUSION SYSTEMS
WERE PUT INTO PRODUCTION AND EVALUATED. WORK WAS
STARTED ON A NEW EMITTER AND GOLD DIFFUSION PROCESS.
WORK WAS STARTED ON THE EMITTER STRIPE WIDTH
EVALUATION. CHEMICAL ETCHING WAS PLACED INTO
PRODUCTION AND WORK ON SLURRY POLISHING IS ALMOST
COMPLETE. A NEW PHOTORESIST WAS EVALUATED AND
PRODUCTION CONTROLS ARE PRESENTLY BEING APPLIED.
NEW ASSEMBLY PARTS AND PROCESSES WERE EVALUATED
FROM THE ASSEMBLY VIEWPOINT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-620 508

BATTELLE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF TITANIUM AND ITS
ALLOYS.

(U)

DESCRIPTIVE NOTE: NASA TECHNICAL MEMO.,

AUG 65 131P

OLOFSON, C. T. ; BOULGER, F. W.

; GURKLIS, J. A. ;

CONTRACT: DA01 02:AMC11651Z

MONITOR: NASA, RSIC

TM-X-53312,409

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUBCONTRACTED TO REDSTONE
SCIENTIFIC INFORMATION CENTER, REDSTONE ARSENAL,
ALA.

DESCRIPTORS: (*TITANIUM, MATERIAL REMOVAL),
(*TITANIUM ALLOYS, MATERIAL REMOVAL), (*MATERIAL
REMOVAL, TITANIUM), MACHINING, MACHINE TOOLS,
GRINDERS, PRECISION FINISHING, CHEMICAL MILLING,
CUTTING TOOLS, PERFORMANCE(ENGINEERING)

(U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-
REMOVAL OPERATIONS FOR TITANIUM AND ITS ALLOYS. IT
DESCRIBES THE METHODS CURRENTLY EMPLOYED FOR
CONVENTIONAL MACHINING, GRINDING, ELECTROLYTIC, AND
CHEMICAL MACHINING PROCESSES. THE PRECAUTIONS WHICH
SHOULD BE TAKEN TO AVOID TROUBLES RESULTING FROM THE
CHARACTERISTICS TYPICAL OF TITANIUM ARE POINTED OUT.
TEN MACHINING, TWO GRINDING, TWO CUTTING, AND TWO
UNCONVENTIONAL METAL-REMOVAL OPERATIONS ARE DISCUSSED
SEPARATELY. IN OTHER SECTIONS, THE MECHANICS OF
CHIP-FORMING PROCESSES, THE RESPONSE TO MACHINING
VARIABLES, COSTS, AND PRECAUTIONS DERIVABLE FROM THE
STANDPOINT OF SAFETY ARE DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-621 454

HARSHAW CHEMICAL CO CLEVELAND OHIO

RESEARCH ON PHOTOVOLTAIC CELLS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 MAY 62-30 APR 65,
JUN 65 125P HEYERDAHL, NORMAN E. HARVEY,

DONALD J. :

CONTRACT: AF33 657 7916

PROJ: 7885

TASK: 788502

MONITOR: ARL , 65-111

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, SEM CONDUCTING FILMS),
(*SEMICONDUCTING FILMS, SOLAR CELLS), CADMIUM
COMPOUNDS, SULFIDES, SELENIUM, CADMIUM ALLOYS,
SELENIUM ALLOYS, TELLURIUM ALLOYS, ZINC ALLOYS,
GALLIUM ALLOYS, ARSENIC ALLOYS, CHEMICAL MILLING,
VAPOR PLATING, MAGNETIC PROPERTIES, ELECTRICAL
PROPERTIES, THERMOELECTRICITY, LIGHT
TRANSMISSION

(U)

IDENTIFIERS: THIN FILMS

(M)

THE REPORT DESCRIBES RESEARCH AND DEVELOPMENT ON
THIN FILM SOLAR BATTERIES. THE FABRICATION AND
STUDY OF THIN FILMS OF CDS:SE, CDSE,
CDTE, ZNSE, AND GAAS AND THIN FILM SOLAR
BATTERIES OF CDS:SE, CDSE, AND CDTE IS
DISCUSSED IN DETAIL. A STUDY OF THE ETCHING
BEHAVIOUR OF II-VI COMPOUNDS, COMPLETED AS A PART
OF THIS PROGRAM, HAS BEEN PUBLISHED ELSEWHERE. AN
ABSTRACT OF THE WORK IS INCLUDED IN THIS REPORT.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML4

AD-622 879

TRW SEMICONDUCTORS INC LAWDALE CALIF RESEARCH AND
DEVELOPMENT DEPT

TRANSISTOR, VHF, SILICON, POWER (10W-500MC). (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JUL 63-15 JAN 65,
JAN 65 120P CLARKE, R. N. ICRISHAL, J. I
REPT. NO. 59-RD-F
CONTRACT: DA36 039AMC03189E
PROJ: 1P6 22001A056
TASK: 1P6 22001A056 01

UNCLASSIFIED REPORT

DESCRIPTORS: (TRANSISTORS, SILICON), VERY HIGH
FREQUENCY, RADIOFREQUENCY POWER, CRYSTALS,
PROCESSING, PACKAGING, CHEMICAL MILLING,
DIFFUSION, SILICONE PLASTICS, VAPOR PLATING,
METAL FILMS (U)

THE TRANSISTOR PRODUCES 10 WATTS AT 500 MC WITH 5-6
DB OF POWER GAIN AND 30-40% COLLECTOR EFFICIENCY.
THE CRYSTAL WAS ORIGINALLY DESIGNED ACCORDING TO
PRESENT POWER GAIN THEORY, BUT IT ONLY HAD ONE TO TWO
DB OF POWER GAIN AT 500 MC. THE SECOND CRYSTAL
DESIGN WAS BASED UPON THE SMALLEST PRACTICAL PATTERN
DIMENSIONS, OR A 0.1 MIL MINIMUM SPACING. THE
REDESIGNED PATTERN ALSO HAD PROVISION FOR ANALYZING
THE TRANSISTOR IN MULTIPLES OF SUB CELLS AS WELL AS
IN ITS ENTIRETY. SUCH AN ANALYSIS SHOWED THE
NECESSITY OF SYMMETRY OF BASE FEED IN COMMON EMITTER
AMPLIFIERS TO GET ALL THE CELLS WORKING TOGETHER.
PARALLELING OF CELLS ALSO INDICATED AN APPARENT
LOSS IN F SUB T WITH INCREASED SIZE. PROCESSING
AND ASSEMBLY WAS GENERALLY ALONG STANDARD INDUSTRY
PRACTICE EXCEPT IN THE AREA OF PHOTORESIST. THERE,
IMPROVED GLASS MASKS WERE USED, ALONG WITH THE NEW
KTR PHOTORESIST. SUCCESSFUL ETCHING OF FINE
METALLIZED PATTERNS WAS ACCOMPLISHED THROUGH THE
DEVELOPMENT OF A JET ETCHING TECHNIQUE. TO RETAIN
AS MUCH OF THE INNATE CRYSTAL PERFORMANCE CAPABILITY
AS POSSIBLE, CONSIDERABLE WORK WAS DONE ON PACKAGING.
IT WAS CONCLUDED THAT NO AVAILABLE PACKAGE WAS
TRULY ADEQUATE. THE BEST AVAILABLE FOR THE R.F.
PERFORMANCE IS THE SILICONE MOLDED PACKAGE DUE TO ITS
SHORT, LOW-LOSS LEADS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-625 317 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY
TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 APR-
30 JUN 65,
JUN 65 31P CASSIDY, MICHAEL ; GREER, PAUL

CONTRACT: DA-36-U39-AMC-06156(E)
PROJ: DA-74001

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*SILICON, TRANSISTORS), DIFFUSION, GOLD,
CHEMICAL MILLING, PRECISION FINISHING,
PROCESSING, ENCAPSULATION, BONDING, GLASS,
WIRE, EPITAXIAL GROWTH,
RELIABILITY(ELECTRONICS), QUALITY CONTROL (U)

PROGRESS DURING THE REPORT PERIOD CONSISTED OF THE
FOLLOWING: (1) FABRICATION OF DEVICES USING THE
BORON TRIBROMIDE (BBR3) BASE DIFFUSION METHOD.
WAFERS ARE ALSO IN PROCESS USING A COMBINATION OF
THE BBR3 BASE DIFFUSION AND THE EMITTER-GOLD
EMITTER DIFFUSION. (2) TRANSITION TO 2-INCH
MASKS TO GIVE BETTER DEFINITION AND DETAIL. MASK
MEASUREMENT BY PRECISE METHODS TO INSURE MASK
ACCURACY AND REPEATABILITY. (3) EVALUATION OF
EFFECTS OF VARIATIONS IN EMITTER STRIPE WIDTH.
(4) FABRICATION OF WAFERS USING THE CHEMICAL ETCH
PROCESS. (5) CONSTRUCTION OF WAFER STORAGE
CABINET TO DETERMINE EFFECTS OF PROLONGED WAFER
STORAGE BETWEEN VARIOUS PROCESS STEPS. (6)
CONTINUED INVESTIGATION OF ULTRASONIC WIRE BONDING
AND ANALYSIS OF THE RESULTS OBTAINED BY ULTRASONIC
BONDING TO RAW KOVAR TOP POSTS. (7) DEVELOPMENT
OF A PROCESS EVALUATION TEST PLAN AND AN
ENVIRONMENTAL STEP STRESS TEST PLAN. COMPLETION OF
INITIAL ELECTRICAL PARAMETER READOUTS. EVALUATION
OF SAMPLES FABRICATED USING THE BBR3 BASE DIFFUSION
METHOD. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-628 230 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY
TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 JUL-
30 SEP 65,

SEP 65 32P KEARKUFF, THOMAS ; GREER, PAUL

CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-74001.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-625 317.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*SILICON, TRANSISTORS), DOPING, GOLD, CHEMICAL
MILLING, PRECISION FINISHING, PROCESSING,
ENCAPSULATION, ULTRASONIC RADIATION, BONDING,
WIRE, ASSEMBLING, RELIABILITY(ELECTRONICS) (U)

PROGRESS DURING THE REPORTING PERIOD CONSISTED OF
THE FOLLOWING: (1) DIFFUSION SYSTEMS. WORK WAS
COMPLETED ON THE BBR3 BASE DIFFUSION SYSTEM, AND
SYSTEM FEASIBILITY WAS DETERMINED. THE EMITTER-
GOLD EMITTER DIFFUSION SYSTEM WAS ALSO EVALUATED FOR
FEASIBILITY. (2) WAFER PROCESSING. THE
FEASIBILITY OF USING 1 1/2 INCH WAFERS WITH SLURRY
POLISH AND CHEMICAL ETCH WAS INVESTIGATED. (3)
WAFER STORAGE. DEVICES WHICH HAD BEEN STORED IN
N2 FOR 15 DAYS AT VARIOUS STEPS WERE PROCESSED AND
EVALUATED. (4) ASSEMBLY PROCESSING. UNITS WERE
CONSTRUCTED USING ULTRASONIC WIRE BONDING OF ALUMINUM
WIRE TO BARE KOVAR POSTS AND DEIONIZED WATER BOILING
PRIOR TO ENCAPSULATION. (5) RELIABILITY.
COMPLETED UNITS WERE EVALUATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-628 230 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY
TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 JUL-
30 SEP 65,
SEP 65 32P KEARKUFF, THOMAS ; GREER, PAUL

CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-74001.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-625 317.

DESCRIPTORS: (TRANSISTORS, MANUFACTURING METHODS),
(SILICON, TRANSISTORS), DOPING, GOLD, CHEMICAL
MILLING, PRECISION FINISHING, PROCESSING,
ENCAPSULATION, ULTRASONIC RADIATION, BONDING,
WIRE, ASSEMBLING, RELIABILITY(ELECTRONICS) (U)

PROGRESS DURING THE REPORTING PERIOD CONSISTED OF
THE FOLLOWING: (1) DIFFUSION SYSTEMS. WORK WAS
COMPLETED ON THE BBR3 BASE DIFFUSION SYSTEM, AND
SYSTEM FEASIBILITY WAS DETERMINED. THE EMITTER-
GOLD EMITTER DIFFUSION SYSTEM WAS ALSO EVALUATED FOR
FEASIBILITY. (2) WAFER PROCESSING. THE
FEASIBILITY OF USING 1 1/2 INCH WAFERS WITH SLURRY
POLISH AND CHEMICAL ETCH WAS INVESTIGATED. (3)
WAFER STORAGE. DEVICES WHICH HAD BEEN STORED IN
N2 FOR 15 DAYS AT VARIOUS STEPS WERE PROCESSED AND
EVALUATED. (4) ASSEMBLY PROCESSING. UNITS WERE
CONSTRUCTED USING ULTRASONIC WIRE BONDING OF ALUMINUM
WIRE TO BARE KOVAR POSTS AND DEIONIZED WATER BOILING
PRIOR TO ENCAPSULATION. (5) RELIABILITY.
COMPLETED UNITS WERE EVALUATED. (AUTHOR) (U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#631 952 13/8
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB

CHEMICAL MILLING OF ALLOY STEELS, (U)

MAR 66 23P KETCHAM, SARA J. ;
REPT. NO. NAEC-AML-2418;
PROJ: RRMA-02-011/200-1/F020-01-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *STEEL), HYDROGEN
EMBRITTLEMENT, STRESS CORROSION,
FRACTURE (METALLURGY), SURFACE PROPERTIES (U)
IDENTIFIERS: STEEL H-11, STEEL 4340, STAINLESS
STEEL 17-7PH (U)

EXPERIMENTS WERE CONDUCTED TO DETERMINE THE EFFECT
OF CHEMICAL MILLING ON SUSCEPTIBILITY OF HIGH
STRENGTH STEELS TO HYDROGEN EMBRITTLEMENT AND STRESS
CORROSION CRACKING. ALLOYS STUDIED INCLUDED H-
11, 4340 AND 17-7 PH. RESULTS INDICATED THAT THE
ACID BATHS USED FOR CHEMICAL MILLING DO INITIALLY
EMBRITTLE THESE ALLOYS, BUT RECOVERY OF DUCTILITY
TAKES PLACE AT ROOM TEMPERATURE WITHIN ONE WEEK IF
THERE IS NO BARRIER TO THE ESCAPE OF HYDROGEN (SUCH
AS A PLATING). A RECOVERY TREATMENT OF 48 HOURS AT
ROOM TEMPERATURE FOLLOWED BY 4 HOURS AT 375F IS
RECOMMENDED. A HIGH STRENGTH STEEL WITH A CHEM-
MILLED SURFACE IS MORE SUSCEPTIBLE TO STRESS
CORROSION CRACKING THAN ONE WITH A MACHINE GROUND
SURFACE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-634 075 13/8 11/6 13/9
BATTIELE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF NICKEL-AND COBALT-BASE
ALLOYS.

(U)

APR 66 146P OLOFSON, C. T. ; GURKLIS, J. A.
; BOULGER, F. W. ;
CONTRACT: DA-01-021-AMC-11651(Z),
MONITOR: NASA , RSIC TM-X-53446 , 482

UNCLASSIFIED REPORT

DESCRIPTORS: (*NICKEL ALLOYS, MATERIAL REMOVAL),
(*COBALT ALLOYS, MATERIAL REMOVAL), (*MATERIAL
REMOVAL, STATE-OF-THE-ART REVIEWS), MACHINING,
GRINDERS, CHEMICAL MILLING, ELECTROEROSIVE
MACHINING, CUTTING, CUTTING TOOLS, DRILLING,
MACHINE SHOP PRACTICE, MACHINE TOOLS, MILLING
MACHINES, REAMERS, LATHES, CUTTING FLUIDS,
DRILLING MACHINES, PRECISION FINISHING, ABRASIVES,
GRINDING, ELECTROLYTES, CLEANING, FRICTION,
HEAT-RESISTANT METALS + ALLOYS, CORROSION-
RESISTANT ALLOYS, MECHANICAL PROPERTIES, COPPER
ALLOYS, IRON ALLOYS, CHROMIUM ALLOYS, CASTING
ALLOYS

(U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-
REMOVAL OPERATIONS FOR NICKEL AND COBALT-BASE
ALLOYS. IT DESCRIBES THE MET CURRENTLY
EMPLOYED FOR CONVENTIONAL MACHINING, GRINDING,
ELECTROLYTIC, AND CHEMICAL-MACHINING PROCESSES. THE
PRECAUTIONS THAT SHOULD BE TAKEN TO AVOID TROUBLES
RESULTING FROM THE CHARACTERISTICS TYPICAL OF THESE
ALLOYS ARE POINTED OUT. NINE MACHINING, TWO
GRINDING, TWO CUTTING, AND TWO UNCONVENTIONAL METAL-
REMOVAL OPERATIONS ARE DISCUSSED SEPARATELY. OTHER
SECTIONS DISCUSS THE CLASSIFICATION OF THESE ALLOYS
AND THEIR GENERAL RESPONSE TO MACHINING VARIABLES.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-634 392 13/8 20/2
NAVAL ORDNANCE LAB WHITE OAK MD

POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE,
LEAD SELENIDE, AND LEAD TELLURIDE: SUPPLEMENT. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 63-FEB 66,
MAR 66 ISP NORR, MAHRNER K. ;
REPT. NO. NOLTR-66-32.
PROJ: FR-46,

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, CRYSTALS),
(*ETCHING, CRYSTALS), (*ELECTROLYTIC POLISHING,
CRYSTALS), (*CRYSTALS, PRECISION FINISHING), TIN
ALLOYS, TELLURIUM ALLOYS, LEAD ALLOYS, LEAD
COMPOUNDS, SULFIDES, SELENIUM ALLOYS,
INTERMETALLIC COMPOUNDS, CRYSTAL LATTICE
DEFECTS (U)
IDENTIFIERS: ETCHES, POLISHES, TIN TELLURIDE,
LEAD SULFIDE, LEAD SELENIDE, LEAD TELLURIDE (U)

THIS REPORT IS A CONTINUATION OF NOLTR 63-156
(AD-423 367). TOGETHER, THE TWO REPORTS PRESENT A
REVIEW OF CHEMICAL AND ELECTROLYTIC POLISHES AND
DISLOCATION ETCHES FOR SNTE, PBS, PBSE,
AND PHTE, COVERING THE PERIOD FROM 1907 THROUGH
1965. THE PRESENT REPORT ALSO DESCRIBES A NEW
POLISH AND A NEW DISLOCATION ETCH FOR TIN TELLURIDE,
AS WELL AS TESTS ON AND IMPROVEMENTS IN SOME OF THE
POLISHES REPORTED IN EARLIER PUBLICATION.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-635 814 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY
TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 OCT-
31 DEC 65.

DEC 65 37P CASSIDY, MICHAEL ; GREER, PAUL

CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-7401,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-635 118.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS),
(*SILICON, TRANSISTORS), DISKS, PREPARATION,
BONDING, DIFFUSION, STORAGE,
RELIABILITY(ELECTRONICS), ULTRASONIC WELDING,
CHEMICAL MILLING, ETCHING, ELECTRIC TERMINALS (U)

PROGRESS DURING THE PAST QUARTER HAS CONSISTED OF
THE FOLLOWING: (1) WAFER PREPARATION:
PROCESSING OF 1 1/2-INCH SLURRY-POLISHED AND
CHEMICALLY ETCHED WAFERS USING THE NEW PREGHMIC TWO-
STEP PHOTORESIST PROCESS. (2) MASK RESOLUTION
AND ALIGNMENT: VERTICAL AND HORIZONTAL
DIMENSIONAL INSPECTION OF MASKS TO ELIMINATE MASK
VARIATIONS. (3) DEIONIZED WATER BOIL:
EVALUATION OF ULTRASONICALLY WIRE-BONDED DEVICES
AFTER SUBJECTION TO DEIONIZED WATER BOIL. (4)
WIRE BONDING: EVALUATION OF UNITS FABRICATED
USING A SONO BOND ULTRASONIC BONDER. (5)
DIFFUSION SYSTEMS: FINAL EVALUATION OF THE
BCL3 SYSTEM. EMITTER DIFFUSION EMPLOYING A
CONTROLLED POCL3 SOURCE TEMPERATURE. (6)
RELIABILITY EVALUATION: EVALUATION OF COMPLETED
UNITS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-639 454 13/8 13/9
BATTELLE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS
AND STAINLESS STEEL ALLOYS. (U)

OCT 65 214P OLOFSON, C. T. ; GURKLIS, J. A. ;
BOULGER, F. W. ;
CONTRACT: DA-01-021-AMC-11651(Z),
MONITOR: NASA ,RSIC TM-X-53433 ,501

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *MATERIAL REMOVAL),
(*MACHINING, STEEL), (*GRINDING, STEEL),
STAINLESS STEEL, STATE-OF-THE-ART REVIEWS, CHEMICAL
MILLING, MACHINE TOOLS, CUTTING FLUIDS, CUTTING
TOOLS, SMALL TOOLS (U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-
REMOVAL OPERATIONS FOR STAINLESS AND ULTRAHIGH-
STRENGTH STEELS. IT DESCRIBES THE METHODS
CURRENTLY EMPLOYED FOR CONVENTIONAL MACHINING,
GRINDING, ELECTROLYTIC, ELECTRIC-DISCHARGE, AND
CHEMICAL-MACHINING PROCESSES. THE PRECAUTIONS THAT
SHOULD BE TAKEN TO AVOID TROUBLES RESULTING FROM THE
CHARACTERISTICS TYPICAL OF THESE ALLOYS ARE POINTED
OUT. NINE MACHINING, TWO GRINDING, TWO CUTTING,
AND THREE UNCONVENTIONAL METAL-REMOVAL OPERATIONS ARE
DISCUSSED SEPARATELY. OTHER SECTIONS DISCUSS THE
CLASSIFICATION OF THESE ALLOYS AND THEIR GENERAL
RESPONSE TO MACHINING VARIABLES. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-648 980 13/8
NAVAL AIR MATERIAL CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB

CHEMICAL MILLING OF METALS AND ALLOYS; ITS EFFECT ON
STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN
EMBRITTELEMENT.

(U)

MAY 61 4P KETCHAM, S. J. ;
REPT. NO. NAMC-AML-1236

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *ALUMINUM
ALLOYS), (*STEEL, CHEMICAL MILLING),
(*CORROSION-RESISTANT ALLOYS, TITANIUM),
DEGRADATION, HYDROGEN EMBRITTELEMENT, TEMPERATURE,
SOLUTIONS, SURFACE PROPERTIES

(U)

IDENTIFIERS: ALUMINUM ALLOY 2024, ALUMINUM ALLOY
7075, ALUMINUM ALLOY X2020

(U)

THE PAPER CONTAINS SPECIFICATIONS TO CONTROL THE
SOLUTIONS AND PROCESSES FOR THE VARIOUS METALS AND
ALLOYS. A METHOD FOR DETERMINING WHETHER ANY STEP
IN THE PROCESS CAN ACCELERATE STRESS CORROSION IN
ALUMINUM ALLOYS AND CORROSION RESISTING STEELS, OR
CAUSE HYDROGEN EMBRITTELEMENT IN STEEL AND TITANIUM
ALLOYS SUSCEPTIBLE TO SUCH EMBRITTELEMENT, IS DESIRED
FOR INCORPORATION INTO THE SPECIFICATION AS WELL AS
ESTABLISHMENT OF CRITERIA FOR ASSESSING THE SEVERITY
OF SUCH EFFECTS. THE PROJECT CONTAINS:
ALUMINUM ALLOYS; STEELS; TITANIUM ALLOYS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-674 066 11/6 13/8
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS
INFORMATION CENTER

A REVIEW OF METALLOGRAPHIC PREPARATION PROCEDURES FOR
BERYLLIUM AND BERYLLIUM ALLOYS, (U)

JUN 68 ZUP PRICE, C. W. MCCALL, J.

L. ;

REPT. NO. DMIC-MEMO-237
CONTRACT: F33615-68-C-1325

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, METALLOGRAPHY),
(*BERYLLIUM ALLOYS, METALLOGRAPHY), REVIEWS,
ELECTRON MICROSCOPY, FINISHES + FINISHING,
GRINDING, ETCHING, CUTTING, MACHINING,
CHEMICAL MILLING (U)

THE MEMORANDUM IS DIVIDED INTO FOUR TOPICS:
(1) GRINDING, (2) POLISHING, (3)
ETCHING, AND (4) THINING FOR TRANSMISSION
ELECTRON MICROSCOPY. PROCEDURES REVIEWED ARE ALSO
LISTED IN TABULAR FORM FOR READY REFERENCE. IN
ADDITION TO REVIEWING PUBLISHED REFERENCES, THE
AUTHORS HAVE INCLUDED A CONSIDERABLE AMOUNT OF
PREVIOUSLY UNPUBLISHED DATA BASED ON THEIR OWN
EXPERIENCE AND PRIVATE COMMUNICATION WITH ASSOCIATES
IN THE FIELD. (AUTHOR) (U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-677 066 11/6 13/8
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

REDUCING HAND STRAIGHTENING BY CHEM-MILLING 7075
AND 7178 ALUMINUM ALLOY IN THE 'W' (OR
NATURALLY AGED) CONDITION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
OCT 60 23P WHITING, H. A. (PLUMMER, C.
E. I.
REPT. NO. GDC-PR919

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, *CHEMICAL
MILLING), ETCHING, SURFACE ROUGHNESS, FINISHES
+ FINISHING, AGING(MATERIALS),
PANELS(STRUCTURAL), MECHANICAL WORKING,
TOLERANCES(MECHANICS) (U)
IDENTIFIERS: ALUMINUM ALLOY 7075, ALUMINUM ALLOY
7185 (U)

THE OBJECTIVE AND PURPOSE OF THE PROJECT WAS TO
ETCH 7075 AND 7178 ALUMINUM ALLOYS, 0.125 IN. THICK,
IN THE 'W' (OR NATURALLY AGED CONDITION). A
MAXIMUM SURFACE ROUGHNESS (RMS) OF 125 MICROINCHES
WAS NOT TO BE EXCEEDED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-677 494

11/6

13/8

GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

STRIPPING PT201 THERMOSETTING RESIN COATINGS FROM
321 ANNEALED STAINLESS STEEL SURFACES,
(PROPELLANT UTILIZATION MANOMETER HOUSINGS).

(U)

SEP 61 15P SHIWANOV, E. ;
REPT. NO. GDA-AN61AMR4062

UNCLASSIFIED REPORT

DESCRIPTORS: (•STAINLESS STEEL, •CHEMICAL
MILLING), THERMOSETTING PLASTICS, SULFURIC ACID,
ULTRASONIC RADIATION, STAINLESS STEEL, REMOVAL,
SURFACES, MANOMETERS, CLEANING, PLASTIC COATINGS

(U)

THE REPORT DISCUSSES THE DEVELOPMENT OF A NEW
CHEMICAL STRIPPER. IT WAS FOUND THAT THE USE OF
SULFURIC ACID IN COMBINATION WITH ULTRASONIC
VIBRATION (40KC.) WAS AN EFFICIENT METHOD TO
STRIP AND DISINTEGRATE PT201 THERMOSETTING RESIN
FROM THE SURFACE OF MANOMETER HOUSINGS. THREE SUCH
HOUSINGS WERE EFFECTIVELY CLEANED BY THIS METHOD
WITHIN A PERIOD OF TEN MINUTES AND WERE IN ACCORDANCE
WITH THE REQUIREMENTS OF MS 60.14BA,
MAINTENANCE CLEANING OF PROPELLANT
UTILIZATION MANOMETERS. (AUTHOR)

(U)

UNCLASSIFIED

DUC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-678 154 13/8 13/13 11/6
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

CHEM-MILL PROCESS FOR CONTOURING ALUMINUM
HONEYCOMB CORE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.;
NOV 60 77P GLENSK, F. J. ;
REPT. NO. GDC-PR-920

UNCLASSIFIED REPORT

DESCRIPTORS: (*HONEYCOMB CORES, *CHEMICAL
MILLING), (*ALUMINUM ALLOYS, CHEMICAL MILLING),
BONDING, PRESSURE, THICKNESS,
PANELS(STRUCTURAL), SANDWICH CONSTRUCTION,
COSTS, FLEXURAL STRENGTH, SPECIFICATIONS,
MASKING, FEASIBILITY STUDIES

(U)

CONTOURING ALUMINUM HONEYCOMB CORE BY MECHANICAL
MEANS IS DIFFICULT AND EXPENSIVE. A REVOLUTIONARY
METHOD OF CONTOURING BY CHEMICAL MILLING HAS BEEN
INVENTED. THIS PROCESS HAS BEEN SUCCESSFULLY
APPLIED TO 1/4 INCH CELL-SIZED CORES. THE PROBLEM
WAS TO CONTOUR 1/8 INCH CELL-SIZED CORES, SINCE THIS
IS A PRODUCTION ITEM. THIS PROJECT WAS AN ATTEMPT
TO ADAPT THE PROCESS TO 1/8 INCH CELL-SIZED CORES.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-680 561 13/8

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CHEMICAL MILLING (DEEP CONTOUR ETCHING),

(U)

MAY 68 14P TARASOVA, V. A. 1
REPT. NO. FTD-HT-23-1225-67

UNCLASSIFIED REPORT

PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE. SEE
INTRODUCTION SECTION OF THIS ANNOUNCEMENT JOURNAL FOR CFST;
ORDERING INSTRUCTIONS.

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO.
SPRAVOCHNIK MASHINOSTROITEL'YA (REFERENCE BOOK FOR
THE MECHANICAL ENGINEER) N.P., 1963 V5 BK. 1 P387-393,
BY E. WARTER.

DESCRIPTORS: (CHEMICAL MILLING, REVIEWS),
INORGANIC ACIDS, CLEANING, MASKING, ETCHING,
LIQUID IMMERSION TESTS, ALUMINUM ALLOYS, TITANIUM
ALLOYS, STAINLESS STEEL, TABLES, POLYVINYL
CHLORIDE, USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

FOR THE SHAPING OF PARTS, INSTEAD OF MECHANICAL
REMOVING OF MATERIAL TO OBTAIN A GIVEN FORM THERE IS
DESCRIBED A METHOD OF ETCHING THE MATERIAL AWAY WITH
CHEMICALS. THERE ARE FOUR OPERATIONS INVOLVED IN
THIS PROCESS. THE MATERIAL NOT TO BE REMOVED IS
PROTECTED BY PAINTS AND VARNISHES, PREFERABLY
CHLORINATED-POLYVINYL-CHLORIDE LACQUERS AND ENAMELS.
ADHESIVE TAPES AND RUBBER ARE ALSO USED. THE
SURFACE HAS TO BE PREPARED BEFOREHAND. NOT MORE
THAN 24 HOURS SHOULD ELAPSE BETWEEN THE APPLYING OF
THESE PROTECTIONS AND THE ETCHING WORK. WEAKENING
AND WARPING IS AVOIDED BY USING CHEMICALS INSTEAD OF
MACHINING. EXTENSIVE TABLES ARE ATTACHED GIVING
DIRECTIONS FOR THE PREPARING AND APPLYING THE
COATINGS TO PROTECT MATERIAL NOT TO BE REMOVED AND
FOR REMOVING THE COATING AFTERWARDS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#681 765 11/6
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

A NEW APPROACH TO BEND TESTING FOR THE DETERMINATION
OF HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF SHEET
MATERIALS, (U)

JUN 61 31P JONES, R. L. ;
REPT. NO. GDA-MRG-235

UNCLASSIFIED REPORT

DESCRIPTORS: (*METAL PLATES, HYDROGEN
EMBRITTLEMENT), (*HYDROGEN EMBRITTLEMENT, TEST
METHODS), STEEL, BENDING, COMPRESSIVE
PROPERTIES, CHEMICAL MILLING, ELECTROPLATING,
CADMIUM, FAILURE(MECHANICS), DUCTILITY,
STRESSES, HYDROGEN, DIFFUSION, STRESS
RELIEVING (U)

IDENTIFIERS: STEEL 4340 (U)

A SERIES OF EXPERIMENTAL PROGRAMS WERE CARRIED OUT
TO DETERMINE THE SUITABILITY AND SENSITIVITY OF A NEW
TEST TECHNIQUE FOR THE DETERMINATION OF HYDROGEN
EMBRITTLEMENT SUSCEPTIBILITY OF MATERIALS. A
SIMPLE BEND TEST WAS USED TO STUDY THE EFFECT OF
CHEMICAL MILLING AND CADMIUM PLATING ON HYDROGEN
EMBRITTLEMENT OF HIGH STRENGTH 4340 STEEL SHEET.
THE BEND TEST CONSISTED OF LOADING A COUPON IN THE
FORM OF A SLENDER COLUMN IN COMPRESSION AT A SERIES
OF FIXED BENDING SPEEDS. BEND DUCTILITY WAS
MEASURED AS THE DEPRESSION OF COLUMN HEIGHT AT
FRACTURE AND ALL DATA WERE REFERRED BACK TO A BASE
LINE CONDITION (NON-EMBRITTLED) FOR COMPARISON.
(AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-683 661 13/6 11/6
BOEING CO RENTON WASH COMMERCIAL AIRPLANE DIV

DETERMINATION OF RESIDUAL STRESS PROFILES BY X-RAY
DIFFRACTION AND STRAIN GAGE METHODS FOR BRAKE-PRESS
FORMED TI-6AL-4V. (U)

DEC 68 41P ESQUIVEL, A. L. ;
REPT. NO. D6-23737

UNCLASSIFIED REPORT

DESCRIPTORS: (*TITANIUM ALLOYS, STRESSES),
(*NON-DESTRUCTIVE TESTING, TITANIUM ALLOYS), X-
RAY DIFFRACTION ANALYSIS, STRAIN GAGES, COLD
WORKING, STRESS RELIEVING, CHEMICAL MILLING,
METAL-FORMING BRAKES (U)
IDENTIFIERS: TITANIUM ALLOY 6AL 4V, *RESIDUAL
STRESS (U)

THE RESIDUAL STRESS PROFILES (STRESS VERSUS
DEPTH) FROM BRAKE-PRESS FORMED TI-6AL-4V
(ANNEALED) RIGHT ANGLE BENDS WERE DETERMINED BY
THE TWO-EXPOSURE X-RAY DIFFRACTION METHOD AND A
STRESS RELAXATION STRAIN GAGE METHOD USING EITHER
CONTINUOUS OR STEPWISE (INCREMENTAL) CHEM-
MILLING. RESULTS FROM THE STRAIN GAGE METHOD WERE
TESTED ON FOUR AVAILABLE STRESS FORMULATIONS. THE
HAIGH EQUATION (COMPUTER PROGRAM: NORS) WAS
FOUND MOST SUITABLE AND IS RECOMMENDED FOR FUTURE
USE. A REASONABLE CORRESPONDENCE WAS FOUND BETWEEN
THE RESIDUAL STRESSES CALCULATED FROM X-RAY PEAK
SHIFT DATA AND THOSE FROM STRAIN GAGE DATA.
RESIDUAL STRESSES OBTAINED BY THE STRAIN GAGE
METHOD UTILIZING CHEM-MILLING WERE FOUND REPRODUCIBLE
TO WITHIN 3 TO 5 KSI. RESIDUAL STRESS PROFILES OF
THE BRAKE-PRESS FORMED BENDS INDICATE COMPRESSIVE
STRESS (-30 KSI) NEAR THE OUTSIDE BEND SURFACE
AND TENSILE STRESSES (40 TO 50 KSI) ON THE INSIDE
BEND SURFACE. DEPTH OF THE COMPRESSIVE STRESSES
VARIED FROM 0.008 TO 0.012 INCH. NO SIGNIFICANT
DIFFERENCES WERE FOUND BETWEEN THE RESIDUAL STRESS
PROFILES OF BENDS 0.045-INCH THICK AND THOSE 0.050-
INCH THICK. (AUTHOR) (U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AU-725 614 13/8 5/2
NAVAL MATERIAL INDUSTRIAL RESOURCES OFFICE PHILADELPHIA
PA

NAVMIRO MANUFACTURING TECHNOLOGY BULLETIN.
NUMBERS 1 THRU 12, DECEMBER 1969-NOVEMBER
1970.

(U)

NOV 7U 79P

UNCLASSIFIED REPORT

DESCRIPTORS: (•MANUFACTURING METHODS, REVIEWS),
MACHINE SHOP PRACTICE, PRECISION FINISHING,
LASERS, POWDER METALLURGY, SINTERING, EXPLOSIVE
FORMING, ULTRASONIC WELDING, COMPOSITE MATERIALS,
CUTTING TOOLS, COOLING, CHEMICAL MILLING,
ELECTRON BEAM MELTING, SPARK MACHINING, FORGING,
NON-DESTRUCTIVE TESTING, CASTING
IDENTIFIERS: COMPUTER AIDED DESIGN

(U)

(U)

THE DOCUMENT IS A COMPILATION OF MANUFACTURING
TECHNIQUES THAT CAN BE EMPLOYED IN VARIED INDUSTRIES(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-727 620 :3/8
GRUMMAN AEROSPACE CORP BETHPAGE N Y

ADVANCED CHEMICAL MILLING PROCESSES.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUL 69-31
DEC 70.

MAR 71 213P STAEBLER, CHRISTIAN J., JR
CONTRACT: F33615-69-C-1840
PROJ: AF-705-9
MONITOR: AFML TR-71-44

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *TITANIUM
ALLOYS), AUTOMATION, INORGANIC ACIDS, MASKING,
ETCHING, HEAT TREATMENT, MECHANICAL WORKING, AIR
POLLUTION

(U)

IDENTIFIERS: HYDROFLUORIC ACID

(U)

THE PROGRAM OBJECTIVE WAS TO IMPROVE THE
CAPABILITY, RELIABILITY, AND COST EFFECTIVENESS OF
CHEMICAL MILLING WHEN APPLIED TO SELECTED AEROSPACE
STRUCTURAL MATERIALS. A COMPLETELY AUTOMATED,
CENTRIFUGAL REGENERATION SYSTEM FOR TITANIUM
HYDROFLUORIC ACID ETCHANT WAS DESIGNED, FABRICATED,
AND TESTED. THIS SYSTEM AUTOMATICALLY ANALYZES THE
ETCHANT, ADDS FRESH ACID, DETERMINES THE TITANIUM
CONCENTRATION, AND ACTIVES A CENTRIFUGE WHICH REMOVES
PRECIPITATED TITANIUM AND RECLAIMS THE ETCHANT. A
NEW, STYRENE-BUTADIENE MASKANT WAS DEVELOPED THAT
GIVES EXCELLENT LINE DEFINITION ON TITANIUM
SUBSTRATES AND THAT CAN BE MANUFACTURED FOR ABOUT
ONE-HALF THE COST OF COMMERCIALLY AVAILABLE MASKANTS.
THE FEASIBILITY OF USING A LASER-DRILLED, HIGH-
ENERGY WATER JET TO SCRIBE CHEM-MILLING MASKANTS WAS
ESTABLISHED. OPTIMUM CHEM-MILLING/FORMING
METHODIZING SEQUENCES WERE ESTABLISHED THAT MINIMIZE
DISTORTION OF TITANIUM ALLOY DETAIL PARTS. SAMPLING
AND ANALYTICAL TECHNIQUES WERE ESTABLISHED FOR THE
MAJOR POLLUTANTS EMITTED BY CHEM-MILLING OPERATIONS.
AIR POLLUTION CONTROL AGENCIES AND EQUIPMENT
MANUFACTURERS WERE SURVEYED. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD5738 271 13/8
BATTELLE COLUMBUS LABS OHIO METALS AND CERAMICS
INFORMATION CENTER

NONTRADITIONAL MACHINING OF BERYLLIUM, (U)

JAN 72 91P GURKLIS, JOHN A. ;
REPT. NO. MCIC-72-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LIBRARY OF CONGRESS CATALOG CARD NO.
78-190407.

DESCRIPTORS: (*ELECTROEROSIVE MACHINING,
BERYLLIUM), (*CHEMICAL MILLING, BERYLLIUM),
(*BERYLLIUM, MACHINING), MACHINE TOOLS (U)
IDENTIFIERS: *ELECTROCHEMICAL MACHINING (U)

THE REPORT DEALS WITH ELECTRICCHEMICAL MACHINING
(ECM), CHEMICAL MILLING, AND ELECTRIC-DISCHARGE
MACHINING (EDM). THE GENERAL CHARACTERISTICS OF
THESE PROCESSES AND THEIR APPLICATIONS TO THE
PROCESSING OF BERYLLIUM PARTS ARE PRESENTED AND
COVERED IN DETAIL. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0HL6

AD-870 146 13/8 11/6 1/3
METCUT RESEARCH ASSOCIATES INC CINCINNATI OHIO

SURFACE INTEGRITY OF MACHINED STRUCTURAL
COMPONENTS.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 FEB 68-30
NOV 69,

MAR 70 361P KOSTER, WILLIAM P. IFIELD,
MICHAEL IKAHLES, JOHN F. IFRITZ, LOUIS J. I
GATTO, LUCIANO R. I
REPT. NO. 970-11700
CONTRACT: F33615-68-C-1003
PROJ: AF-721-8
MONITOR: AFML TR-70-11

UNCLASSIFIED REPORT

DESCRIPTORS: (AIRFRAMES, STRUCTURAL PARTS),
(MATERIAL REMOVAL, EFFECTIVENESS), MILLING
MACHINES, GRINDING, DRILLING, ELECTROLYTIC
POLISHING, ELECTROEROSIVE MACHINING, CHEMICAL
MILLING, MICROSTRUCTURE, MARTENSITE,
DEFECTS(MATERIALS), SURFACE ROUGHNESS, STRESS
CORROSION, FATIGUE(MECHANICS),
AGING(MATERIALS)

(U)

IDENTIFIERS: NICKEL ALLOY INCONEL 718, TITANIUM
ALLOY 6AL 4V, STEEL 4340, ELECTROCHEMICAL
MACHINING, ELECTRICAL DISCHARGE MACHINING,
CHEMICAL MACHINING

(U)

A PROGRAM HAS BEEN RUN TO EVALUATE THE EFFECTS OF
DIFFERENT METAL REMOVAL METHODS AND VARIATIONS OF
THESE METHODS ON SURFACE INTEGRITY. THREE ALLOYS
WERE STUDIED: BETA ROLLED TI-6AL-4V; AISI
4340, QUENCHED AND TEMPERED, 50 RC; AND INCONEL
718, SOLUTION TREATED AND AGED. VARIOUS GRINDING
PROCEDURES CAUSED THE TITANIUM ALLOY TO EXHIBIT A
FATIGUE STRENGTH RANGE OF 13 TO 62 KSI. THE
FATIGUE STRENGTH OF 4340 DUE TO GRINDING VARIABLES
RANGED FROM 62 TO 102 KSI, WHILE INCONEL 718 SHOWED
A RANGE OF 24 TO 60 KSI. ABUSIVE GRINDING
CONDITIONS ALWAYS RESULTED IN FATIGUE STRENGTHS AT
THE MINIMUM OF THESE RANGES. MILLING VARIABLES
EXHIBITED A FATIGUE STRENGTH RANGE OF 32 TO 72 KSI IN
THE BETA ROLLED TITANIUM ALLOY. EDM AND ECM ON
INCONEL 718 YIELDED 22 AND 39 KSI, RESPECTIVELY,
COMPARED TO 60 KSI FOR GENTLE GRINDING. GUIDELINES
FOR PROCESSING AEROSPACE HARDWARE CONSIDERING SURFACE
INTEGRITY REQUIREMENTS ARE PRESENTED IN THE REPORT. (U)

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CORPORATE AUTHOR - MONITORING AGENCY

•AEROJET-GENERAL CORP SACRAMENTO
CALIF

• • •
STRUCTURAL TESTS OF A
CHEMICALLY MILLED LAGISH D-6AC
STEEL SECOND-STAGE MINUTEHAN AF1
CLOSURE
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•AERONAUTICAL SYSTEMS DIV WRIGHT-
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METAL,
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STRUCTURAL COMPONENTS.
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RESEARCH ARLINGTON VA

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PRODUCTION ENGINEERING MEASURE
TO IMPROVE PRODUCTION TECHNIQUES
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SHAPING
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MACHINING AND GRINDING OF
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RESEARCH IN THE GENERAL FIELD
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•LOCKHEED MISSILES AND SPACE CO
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•MARTIN CO BALTIMORE MD

THE EFFECT OF SURFACE-ACTIVE
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OF METALS. PART II. THE EFFECT OF
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•METAL HYDRIDES INC BEVERLY MASS

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AND POLYCRYSTALLINE TITANIUM
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•METCUT RESEARCH ASSOCIATES INC
CINCINNATI OHIO

970-11700
SURFACE INTEGRITY OF MACHINED
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•MOTOROLA INC PHOENIX ARIZ

PRODUCTION ENGINEERING MEASURE.
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•MOTOROLA INC PHOENIX ARIZ
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PRODUCTION ENGINEERING MEASURE
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AND INCREASE THE RELIABILITY OF
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• NAVAL AIR ENGINEERING CENTER
PHILADELPHIA PA AERONAUTICAL
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